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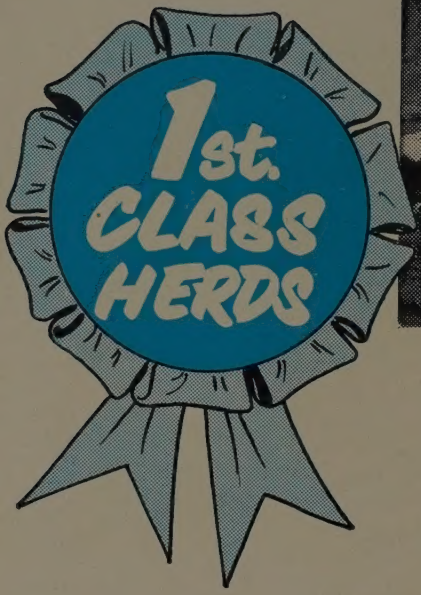

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TABLE OF CONTENTS

Grassland Association Conference at Ruakura ..	G. J. Neale ..	530
Replacement of Winter Fodder Crops Susceptible to Cauliflower Mosaic	M. L. Cameron ..	535
Dairy Produce Graded for Export	.. .. ..	536
Mr. E. J. Fawcett, Director-General of Agriculture, to Retire	.. .. ..	537
A Topdresser that Mixes as it Sows	J. L. Doutre ..	539
Housing and Equipment for Laying Pullets ..	.. .. ..	543
Meteorological Records for October	.. .. ..	544
Successful Pasture Establishment in Central Otago	R. C. Schofield ..	545
Weed Identification: Variegated Thistle	D. I. Glue and L. J. Matthews ..	547
What Wool Buyers Take into Account	J. E. Duncan ..	549
Care of Livestock during January	.. .. ..	558
Pasture Management and Pest Control	.. .. ..	559
Use of Bee Escapes for Removal of Honey ..	J. E. Rodie ..	561
Radio Broadcasts	.. .. ..	562
District Committees for Facial Eczema Warnings	.. .. ..	563
The Home Garden	A. G. Kennelly ..	567
Cooling of Milk and Cream	M. J. McFetridge ..	574
Emphasis on Profitability in Pig Production ..	A. Longwill ..	575
An Electric Fence for Sheep	W. T. Steer ..	580
Domestic Beekeeping	A. W. Bennett ..	581
Trends in Sub-tropical Fruit Production	W. A. Fletcher ..	584
Farming in Ida Valley, Central Otago	A. H. Mouat, R. C. Stuart, and G. Mason ..	585
Low-density Hay Baling	L. H. Weston ..	593
Seed Production in N.Z.: Crested Dogstail ..	A. Stuart ..	598
Comparison of Effects of Copper Methylarsenate and Phenothiazine on Worms in Sheep ..	D. C. Elliott, P. L. Thomas, and B. O'Grady ..	601
Show Dates	.. .. ..	602
Caterpillar Damage to Commercial Potato Crops	C. J. Hamblyn ..	603
Weed Control in Field Brassicas and Onions ..	B. A. J. Smith ..	607
Trends in Citrus Fruit Production and Plantings	W. A. Fletcher ..	609
Cosmetic Hold-all	Eleanor Couston ..	614
Foam Rubber in the Home	Maud B. Strain ..	615
Appetising Ways of Serving Cream Cheese ..	Mary Hunt ..	620
The Flower Garden	J. P. Salinger and Rosalie A. Campion	621

This Month's Cover

The spirit of Christmas and the joy and satisfaction which come from the tradition of giving have been charmingly caught in the scene shown on this month's cover, which has been reproduced from a colour photograph by R. V. Francis Smith.

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▲ At one of the several demonstration points at the Ruakura Animal Research Station at which work at the station was discussed during the field trip. Here results of investigations into silage making are being explained. In the background on a rise giving a wide view over the station is the new conference hall nearing completion and used for a conference for the first time by this meeting of the Grassland Association. A covered way joins it to the new laboratory block beyond, which is also nearing completion.

Grassland Association Conference at Ruakura

By G. J. NEALE

AN American farmer who, overwhelmed with a flood of information from agricultural extension agencies, pleaded with them to stop sending him advice on how to improve his farm, as "I don't farm so well now as I know how", was quoted by Mr. E. J. Fawcett, Director-General of Agriculture, in his opening address to the 19th conference of the New Zealand Grassland Association held in the new conference hall at the Department of Agriculture's Ruakura Animal Research Station, Hamilton, in October. Mr. Fawcett's suggestion that the same admission might be made by many New Zealand farmers seemed to be borne out by the marked decline in farmer interest in this conference.

THE Grassland Association's conference programmes have always been designed to encourage full farmer participation, and for several years past enrolments of farmers for conferences at other centres have comprised a large proportion of the Association's membership. The advisory services of the Department of Agriculture, supplemented by the annual Farmers' Conference Week at the Ruakura Station, the extension services of the highly organised dairy industry in the Waikato, and the operations of several farm improvement clubs there, might be keeping local farmers as up-to-date with their farming knowledge as they feel they need to be.

Two Basic Animals

Introduced by the Association's president, Mr. S. H. Saxby, as one of the 29 people who attended a meeting in 1931 that led to the formation of the Grassland Association, Mr. Fawcett, who is to retire from the Director-Generalship of the Department of Agriculture at the end of this year, said he hoped it would be appropriate if at the end of his service he did a "little rambling over the years".

The Association, in its work and at its conferences, had carried out the principles of one of its founding members and his predecessor in office, Mr. A. H. Cockayne, said Mr. Fawcett. Mr. Cockayne had said that there were only two animals with which the grassland worker need concern himself, the milking cow and the ewe. If as much pasture as possible were grown and fed to these two animals to their maximum capacity, production must go up. Since the Association was formed in 1933 the number of cows milked had increased by 33 per cent. and the number of ewes by 55 per cent. Efficiency of their utilisation of feed had also increased, but how much of this was due to breeding and how much to feeding he was not prepared to say. Many practical farmers held that what they put into their animals governed what they took out. Some of the 90 per cent. increase in wool production was due to the breeding of better woolled sheep.

Since 1931 values of exports had increased as follows: Dairy products, 400 per cent.; meat, 600 per cent.; and wool 1500 per cent.

Vulnerability of Markets

"Much of our prosperity today is due to the price structure of our export trade rather than to increase in volume of production," said Mr. Fawcett. "In the last 8 or 9 years 15 per cent. only of the increase in our overseas earnings has been due to volume and 85 per cent. to price. This cannot be stressed too strongly as an indication of our vulnerability, de-

Future Conferences and Officers

The annual conference of the New Zealand Grassland Association in 1958 will be held at Dunedin. Gisborne has been recommended for consideration as the venue for the 1959 conference.

Officers elected at the annual meeting were: President, Dr. L. Corkill; vice-president, Mr. C. E. Iversen; Secretary, Mr. J. Doidge; members, Dr. P. D. Sears, Mr. A. G. Elliott. Mr. S. H. Saxby, immediate past president, is a member of the executive committee.

"Proceedings" of the conference, containing papers and discussions, may be ordered from the secretary to the Association, P.O. Box 2298, Wellington (price 15s.).

pendent as we are on the prosperity of overseas consumers."

The increases in production had been attained principally by efficiency of pasture production and stock management, but a multiplicity of other agencies contributed, such as the scientist, the extension worker, and the farmer himself, who had had to become perhaps the greatest scientist of the lot. The influence of commercial firms should not be overlooked. They had been the bankers of New Zealand farmers, particularly in the early years, and through their drive had contributed tremendously to the development of the farming industry. Scientists and extension workers should not be too complacent about the improvements effected, as they were not the only agencies responsible.

Associated with increased production there had been an intensification of many types of diseases, some of them associated with improved pastures, and work on animal health problems was becoming more and more important.

Export Market Problems

"We are moving gradually away from problems of food production to problems of how to dispose of it," said Mr. Fawcett. "There is no question that we have the knowledge to continue to increase production and to have surpluses for sale, but the problems of disposal are in many ways more difficult. We are told that people of many nations are underfed, but in our historic markets where we can still sell at prices that enable us to meet our standards of living, supply is meeting demand. In the long run these markets where people are in the main underfed are those on which we will have to depend. Therefore, improvement in the living standards of the so-called backward nations is of great importance to us.

"We can produce the goods and are producing them; our production potential was never better. We are fortunate that wool is such an important commodity in international markets. Returns from the wool clip have saved the situation regarding our overseas balances time and again, and there should be no serious fall in wool prices in the foreseeable future."

Markets for Beef

The United Kingdom, said Mr. Fawcett, was the main market for beef and always would be, but consumption there was not going up materially and had just passed the pre-war per head figure. There was no question that consumption at

Mr. S. H. Saxby Receives First Grassland Association Award

THE first award of the New Zealand Grassland Association for outstanding contributions to the betterment of grasslands in New Zealand was made to Mr. S. H. Saxby, retiring president of the Association, at the Association's annual meeting in Hamilton in October. The decision to make such awards was made by the Association last year and a recommendation from the organising committee of the 7th International Grassland Congress that Mr. Saxby be given the award in recognition of his services to the New Zealand Grassland Association and his outstanding work in the organisation of the international congress was unanimously adopted by the Association's executive committee.

The award was presented by the incoming president, Dr. L. Corkill.

Mr. Saxby was for several years secretary to the New Zealand Grassland Association and resigned to become organising secretary to the 7th International Grassland Congress. He returned to the executive of the New Zealand Association as vice-president and then president. He was recently appointed Assistant Director of the Extension Division of the Department of Agriculture.

Left to right—Mr. S. H. Saxby, retiring president of the Association and first recipient of its award for outstanding contributions to grassland improvement; Mr. E. J. Fawcett, retiring Director-General of Agriculture, who opened the conference; Mr. J. M. Ranstead, Matangi, whose contribution to advancement of agriculture was recognised by the award of the Bledisloe Medal in 1931.

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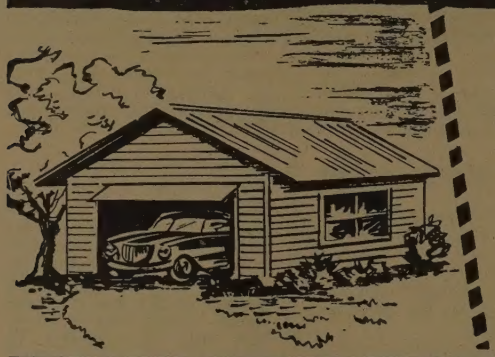

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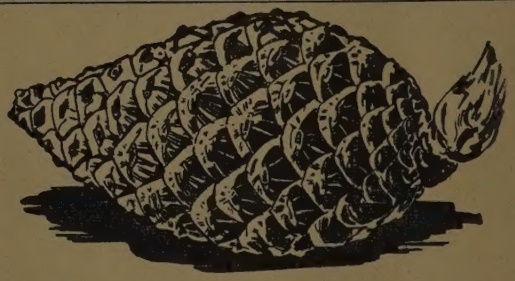

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prices people could afford to pay was limited. Britain herself was encouraging more and more home production.

Meat and dairy produce had been the main items discussed by the New Zealand trade mission to Britain earlier this year, and an Australian mission had followed shortly afterward to discuss the same subjects. It had subsequently been shown that the New Zealand mission's estimate of the forward supply and demand position in the United Kingdom had been very accurate, and though there appeared to be no immediate cause for alarm, there would undoubtedly be a threat to New Zealand's meat industry in the next 5 or 6 years from the Argentine. Both New Zealand and Australia had asked for protection by revision of terms of the Ottawa Agreement, but both had been declined by the United Kingdom authorities, who considered there was no cause for alarm.

"With Australia and New Zealand both concerned," said Mr. Fawcett, "it becomes necessary to look for outside markets. Markets outside the United Kingdom have taken 60,000 to 70,000 tons of beef this year. A few years ago a large quantity was sold to the U.S.S.R., but none has been sold there since. This year Japan has taken 8000 to 9000 tons. Whether this trade is sporadic we do not know, but with shipping to the East becoming available and an upsurge in the demand for meat in eastern countries, there is hope that there may be a permanent market there, but that entails reciprocal trade."

Of extreme importance to the dairy industry was the sale to the United States this year of 13,000 to 14,000 tons of boneless beef at £56 more a ton than would have been realised on the normal market. If the whole of this class of meat could be sold to the United States, it would mean £1½ million to £2 million more to New Zealand dairy farmers than they would otherwise get. The New Zealand Meat Producers Board's action in sending him to the United States to investigate complaints about packing of the meat sent there was to be highly commended, said Mr. Fawcett. He had got a sound grounding on what was required in the United States and the recommendations he had made on his return should ensure that packing troubles would be overcome and the market assured. Boneless beef was in tremendous demand in America for all sorts of processed meats and the demand was rising rapidly as outdoor eating became more popular. The demand was encouraged by the manufacturers of barbecue outfits for use in the house, the back garden, the motor launch, or caravan.

There was advocacy from time to time that New Zealand should get into the lamb trade in the United States. A good trade in carcass lamb was being built up there, but the United States stipulated that carcasses should be thawed out and as there were no facilities for refreezing, that particular trade had to be closed.

A great deal was heard about the big business in prepacked lamb and fancy meat packs in the United States. Such business in beef cuts was a good one. Americans by and large did not eat frozen meat. It was remarkable that every New Zealander said New Zealand frozen lamb was the best in the world, but he would not eat it himself; nor would the American.

Eighty per cent. of the meat bought by the public in the United States was sold by the super markets. There was no family butcher as he was known in New Zealand. To get frozen cuts into United States households would entail sale through one of the super market enterprises. Mr. Fawcett thought that this business might come gradually for the New Zealand producer, particularly as quick-freeze compartments were included in every refrigerating unit in American households.

Butter and Cheese

Markets for New Zealand's dairy produce were of tremendous value and a tremendous worry, said Mr. Fawcett. Total consumption of fats in the United Kingdom was high. To get a greater share of that consumption for butter, margarine had to be fought. "It becomes a very delicate operation to determine how near parity with margarine we can go, and that finally will determine our share of the market. A differential of somewhere between 8d. and 9d. with margarine appears to be as near as we can go."

Supplies of butter available to the United Kingdom market were increasing from New Zealand, Australia, and from time to time from Continental sources, though much of the last was sporadic. Liquid milk produced in the United Kingdom was bought by the Milk Board and its volume had increased tremendously. The balance not used in liquid form was put into manufacture, the returns from which were pooled with those from liquid milk and spread over the whole production. This pooling of returns from liquid milk, cheese, and butter did not materially reduce the over-all return to farmers, who were therefore increasing their output. The efficiency of the industry was quite remarkable. In addition to liquid milk the United Kingdom was producing 125,000 tons of cheese (against the 85,000 tons from New Zealand) and 30,000 tons of butter. The price New Zealand could get for cheese in the United Kingdom was controlled substantially by home production. The great problem was to know what to do with stocks in store and on the water. Cheese was not a very elastic commodity. The desirability of switching from cheese to butter manufacture had been suggested, but reduction of New Zealand's exports of cheese to the United Kingdom would leave more room for the home production of the United Kingdom and for exports from Australia and Canada.

Disposal of Surpluses

The United States, said Mr. Fawcett, had been regarded as the principal culprit in difficulties created by the disposal of surplus dairy products on overseas markets, but their programmes had generally been fairly thoughtful of others' interests, though New Zealand's markets had sometimes been affected.

The problem, however, was a much wider one than that presented by the United States. It was brought about almost wholly by support prices and control of disposal of the residue after domestic requirements had been met.

Papers and Speakers

Opening Address, E. J. Fawcett.

Presidential Address, S. H. Saxby.

"Aspects of Soil Moisture and Irrigation", D. S. Rickard.

"The Water Requirements and Management of Irrigated Pasture", H. G. Hopewell.

"Mechanics of Spray Irrigation", B. R. Homersham.

"The Economics of Spray Irrigation", J. M. Miller.

"Survey of the Use of Short-rotation Ryegrass", R. H. Scott.

"The Use of Short-rotation Ryegrass on a Bay of Plenty Farm", H. T. Titterton.

"The Use of Short-rotation Ryegrass at Lincoln College", C. E. Iversen.

"The Use of Short-rotation Ryegrass on a Manawatu Fat Lamb Farm", D. R. Willis.

"Improvement of *Lotus uliginosus*", P. C. Barclay.

"The Influence of Treading on Pasture", D. Edmond.

"Weedkillers as an Aid to Pasture and Crop Establishment", L. J. Matthews.

"Rates of Grass Seeding and Topdressing of New Pastures Sown Down under Varying Conditions of Soil Fertility and Farm Management", A. V. Allo and B. T. Jordan.

"Establishing and Maintaining Swards on Airstrips on Farms in the Auckland Province", E. H. Arnold.

"Some Factors that Influence the Rate of Growth of Pasture", R. W. Brougham.

"Sulphur Responses on Pastures", T. W. Walker.

"Some Aspects of Germination Analysis", A. V. Lithgow.

At several demonstration points on the irrigation experimental area of the Rukuhia Soil Research Station visited during the field trip, results of work on soil fertility and pasture production were discussed.

These circumstances occurred in other countries than the United States, particularly on the Continent and in Scandinavia.

With the strength now possessed by farming organisations throughout the world and their consequent political influence, there was no question that support prices in one form or another were here to stay.

"It is a question," Mr. Fawcett said, "of whether we should damn the system of support prices or learn to live with them, and I think it will have to be the latter. The Food and Agriculture Organization has studied the problem for many years and Lord Boyd-Orr at one time worked out a scheme for a World Food Bank. That seems to be something like the line along which we will have to work if world markets are not to be upset by surpluses."

European Market Moves

The possible economic effects on New Zealand of the two movements in Europe for the establishment of a Common Market and a Free Trade Area were well worth study, said Mr. Fawcett. The European Common Market Scheme proposed a combination of six countries under which they operated in concert, with no internal trade barriers and a common tariff front to outsiders. Their avowed intention was to become self-supporting in food and agricultural production and to have an industrial structure that could compete against the rest of the world. They had the potential of a very sound economic bloc in Europe that presented a very awkward position for the manufacturing industries of the United Kingdom and some Scandinavian countries.

Nations proposing a wider Free Trade Area envisaged combining with the European Common Market, except that the United Kingdom would not contemplate agricultural production coming within the free trade orbit, because of concern for Commonwealth markets and her own agriculture. It was consequently very doubtful whether the Free Trade Area would become affective. If it did not, the United Kingdom would not be able to get into the Common Market group except through a high tariff barrier.

Fertiliser Conservation

NEW ZEALAND farmers had come to expect that the availability of phosphate was inexhaustible and were going on using a lot that might or might not be necessary, Mr. E. J. Fawcett, Director-General of Agriculture, told the recent conference of the New Zealand Grassland Association. The main sources of supply of phosphate rock (Nauru and Ocean Island and Christmas Island) gave the highest grade and cheapest phosphate in the world, but at the present rate of usage and expected increased manufactures the deposits could last only about another 40 years, he said. Even in the next few years the rate of usage in Australia and New Zealand could bring the necessity to go out to dearer markets for phosphate.

"This is a serious matter in face of the problems before us," said Mr. Fawcett. "A nice little problem for the agricultural scientist to solve is the better use of the P_2O_5 that is applied every year. Somewhere about 20 per cent. of applied phosphate is readily available to the plant. The rest is locked in the soil and only slowly available. If scientists could find how a greater proportion could be made readily available, we could reduce our rate of usage considerably."

Phosphate interests in the United Kingdom had told him a few months ago, said Mr. Fawcett, of the great deal of work being done on methods of extracting P_2O_5 from rock, and he considered that within the next 10 years there could well be a revolution in the way phosphates are applied to the soil. It might be as a liquid instead of as a solid, and he could not see why that should not be possible.

Commonwealth Solidarity

As the European market proposals developed, said Mr. Fawcett, Commonwealth solidarity was likely to be an issue of major importance. The recent meeting of Commonwealth Finance Ministers passed a resolution to consolidate Commonwealth relations. It had been forecast that a meeting in Canada, possibly next year, would produce a new Ottawa Agreement. The new Canadian Prime Minister had said he would advocate closer ties and greater trade between Canada and the United Kingdom and an offer had been made to negotiate an agreement that would immediately affect manufacturers in both countries.

If the establishment of a Commonweath common market were ever seriously considered, it would suit New Zealand agriculture admirably, because it would give free entry of farm products to the markets of all Commonwealth countries, but it would not suit the manufacturers, because it would mean the end of tariffs and embargoes against imports.

"The problems ahead are challenges presented to producers, scientists, and the Government," said Mr. Fawcett. "We have had challenges before and have met them. I am satisfied we can meet those in the procurement of markets. We should not allow these short-term rebuffs to affect our outlook, but should by every conceivable method increase our output, hold our costs as far as possible, though many are beyond the control of the producer, and go ahead with our heads in the air, but our feet on the ground," he concluded.

Replacement of Winter Fodder Crops Susceptible to Cauliflower Mosaic

By M. L. CAMERON,
Instructor in Agriculture, Department of Agriculture, Timaru

OVER the past two seasons the incidence of cauliflower mosaic virus in Canterbury has greatly reduced the reliability of white-fleshed turnips and a number of swede varieties. In many districts farmers are faced with the problem of reducing their dependence on these formerly reliable crops, which carried large numbers of stock over winter.

SWEDES and turnips have, in the past, proved to be a most economical winter supplement and usually serve as a convenient step in pasture renewal. Consequently their total or partial replacement is a problem which cannot be solved simply, since the management of the whole farm can become involved. Several alternative brassica crops are available, but these cannot be grown satisfactorily on all soils and it is convenient to consider the problem in relation to the following two soil groups.

Soils Suited to White-fleshed Turnips

On the lighter and drier soils of Canterbury, white-fleshed turnips, by virtue of their quick growth and low fertility and moisture requirements, have been found to be the only winter brassica crop which can be grown satisfactorily. It is on these soils that the effects of cauliflower mosaic have been severe. Since no direct replacement crop can be grown, the solution lies in the adoption of one or several farm-management practices aimed at reducing dependence on the turnip crop. Though, in this article, these practices are dealt with separately, it is likely that several such practices would need to be adopted on any one farm to replace the turnip crop fully or partially.

Though at present the likely effects of cauliflower mosaic in future turnip crops cannot be predicted, the continued use of the crop may be a justifiable risk in many districts.

Late Sowings and Turnip-grass Mixtures

Two practices can be employed to lessen the risk of crop failure. Field observations have indicated that when sowings are delayed until late February or early March the likelihood of crop failure is less. Quick-maturing turnips must be used for late sowings. An early winter can seriously affect the growth of such late-sown crops, and it may be advisable to sow only a portion of the crop at this time.

The risk associated with the turnip crop may be further reduced by sowing a mixture of white-fleshed turnips and Italian or short-rotation ryegrass. This method requires little extra preparation of the land, but early sowing of the mixture is advisable. If the turnip crop fails, early sowing allows time for the grass to make increased growth before the onset of winter.

Greenfeeds

Cereal greenfeeds can also be valuable, particularly where early sowings of turnips have failed. Though from the point of view of nutrition, Italian or short-rotation ryegrass is to be preferred to the cereal greenfeeds, the latter can be sown later and require less land preparation. Thus when an apparently good turnip crop fails late in autumn, cereal greenfeeds may well be the only means of improving the winter feed position.

Lupins can be grown as an alternative crop, though generally their popularity is declining. When sown with turnips, greenfeed, or grass, they provide a useful insurance against turnip failure.

Autumn-saved Grass

Perhaps one of the most satisfactory ways of guarding against shortages of winter feed is in the saving of autumn pasture growth for use during winter and particularly just before lambing. By exploiting seasonal pasture growth in this manner it is possible to reduce greatly dependence on special fodder crops.

Though under Canterbury conditions a high standard of management is required if sheep are to be wintered entirely on grass, it should be possible on many farms to shut up a considerable area of pasture for this purpose. Strict rationing of the grass crop is necessary, particularly if autumn growth has been less than expected, and ample supplies of good hay must be available.

On high-fertility soils fodder beet is very reliable and gives high yields.

REPLACEMENT OF WINTER FODDER CROPS . . .

Grass can be saved to the greatest extent in areas where lambs are quitted earliest, since a large part of the farm can be shut up early for flushing and saved grass. Some light land farms over the past two winters have been able to carry 1000 ewes for a month on 30 to 40 acres of saved grass, this ration, of course, being supplemented with hay. In these years autumn growth has been good and winters mild, but the practice has great possibilities.

Seasonal variations in grass yield can be compensated for by varying the hay ration and stricter or laxer rationing of the available grass. It must be emphasised that saved grass can be produced only from high-quality, well-balanced pastures.

Hay and Silage Supplements

The basis of all management techniques aimed at reducing dependence on winter brassica crops lies in the provision of adequate high-quality hay. Today in much of Canterbury such a requirement usually means lucerne hay, and except in the higher-rainfall foothills or on the poorly drained coastal soils, there are few areas there where good lucerne or lucerne-grass mixtures cannot be grown.

Techniques of establishing and maintaining lucerne have been improved considerably in recent years, and when reduction of the area of winter brassica crop is planned serious consideration should be given to the establishment of a lucerne or lucerne-grass stand. The latter can also provide valuable winter grazing. Deficiencies in winter feed crops can be levelled out by the adjustment of the hay ration to maintain the desirable rising plane of nutrition.

In these functions silage has a similar place. Though this supplement is generally more expensive to conserve than hay, particularly if the area to be handled is large and baling is necessary, there are many farms where silage has a valuable place, even if not made every year. In contrast to hay it can be stored cheaply for long periods and can contribute much to the stability of winter and summer feed programmes in years of shortages.

Soils Suited to Swedes and Chou Moellier

In the moister and in the cooler regions swedes and chou moellier are grown or can be grown for winter feed. Though many of the most popular swede varieties have shown little resistance to cauliflower mosaic, varieties such as Calder, Sensation, and Wilhelmsburger have given quite satisfactory results under very unfavourable conditions. Chou moellier has proved very resistant. It would be prudent in areas suited to the growing of swedes to sow only those varieties which will crop well in the presence of cauliflower mosaic.

Where fertility is high mangels and fodder beet can greatly reduce dependence on swedes and turnips. Both mangels and fodder beet require intensive cultivation, but on the other hand give high yields and are extremely reliable. However, their use as a substitute for swedes or turnips is likely to be restricted to soils where high yields can be obtained.

Concentrates

Over the past few years concentrates have been used to a limited extent in commercial flocks. Generally they have been used in small quantities to supplement low- or poor-quality feed reserves.

Though concentrates as a total ration are unlikely to compete with fodder produced on the farm, there is every possibility that they may form a valuable part of the ration for young stock on farms near their maximum carrying capacity. Concentrates cannot be classed strictly as an alternative to winter brassica crops, but they can materially assist in balancing low-quality fodder in years of shortage.

Other Alternatives to Swedes

As in the regions where white-fleshed turnips are the only satisfactory brassica crop, greenfeeds, saved grass, hay, and silage can all be used on the soils suited to the growing of swedes and chou moellier. Most of these alternatives fit into the management of the developed farm more easily than they do on the property under development. On the latter there are few crops which can be used to replace the swede crop as an economical and necessary step in pasture renewal, and while resistant varieties are available this crop should be persevered with wherever possible.

Pasture Renewal a Governing Factor

The alternative crops and management practices mentioned in this article are suggested as ways in which dependence on winter brassica crops can be reduced. Obviously all would not be used on any one farm, but it is likely that adjustment of the farm programme to include those which suit the management could help considerably in reducing feed shortages should the turnip or swede crop fail.

In reality they are not so much alternatives as practices which have evolved on highly developed farms in an effort to make most use of the grass produced, and as such can be confidently recommended. However, it should always be borne in mind that a reduction in the area of winter brassica crop or its elimination from the farm programme usually results in a slowing of the rate of pasture renewal, which, over a period of years, could result in a deterioration in pasture quality. Where fertility has been built to a high level and experience has demonstrated the lasting qualities of the pastures, this may not be a serious consideration, but where these factors are doubtful, the question of regular pasture renewal must be considered as a vital policy question.

Dairy Produce Graded for Export

THE following figures showing quantities of dairy produce graded for export during September 1957 and for the 2 months ended 30 September 1957 with comparative figures for the same month and the 2 months of 1956 have been compiled by the Dairy Division of the Department of Agriculture from figures supplied by divisional officers at the various grading ports:—

BUTTER

Period	Creamery (tons)	Whey (tons)	Total (tons)	Percentage Inc. or dec.
September 1957	17,992	269	18,261	—
September 1956	14,799	246	15,045	—
Increase or decrease	+3,193	+23	+3,216	+21.376
2 months ended 30/9/57	29,183	379	29,562	—
2 months ended 30/9/56	25,348	359	25,707	—
Increase or decrease	+3,835	+20	+3,855	+14.996

Butter in store at 30 September 1957 was 18,707 tons

CHEESE

Period	White (tons)	Coloured (tons)	Total (tons)	Percentage Inc. or dec.
September 1957	6,159	1,095	7,254	—
September 1956	5,907	416	6,323	—
Increase or decrease	+252	+679	+931	+14.724
2 months ended 30/9/57	7,777	1,135	8,912	—
2 months ended 30/9/56	7,653	416	8,069	—
Increase or decrease	+124	+719	+843	+10.447

Cheese in store at 30 September 1957 was 8,775 tons

If these figures are converted into butterfat equivalent, there is an increase of 14.224 per cent. in butterfat graded for the 2 months as compared with the preceding season. The above figures refer only to butter and cheese graded for export, and owing to diversions which may take place from time to time they are not necessarily a true indication of production trends.

Pioneer in Farming Economics

Mr. E. J. Fawcett, Director-General of Agriculture, to Retire

MR. E. J. FAWCETT, Director-General of Agriculture since 1943, is to retire at the end of December. He has been an officer of the Department of Agriculture for 35 years.

FOR 20 years Mr. Fawcett has been widely known for the important part he has played in shaping the primary production policy of the Dominion. What is not so widely known and appreciated is the background of training and work through which he prepared himself for the onerous duties of Director-General.

Mr. Fawcett joined the Department in 1922 at a time when the work of the Department was being reorganised after the 1914-18 war and the general advisory service of the Fields Division was being strengthened by the appointment of professional officers. His first position was that of Assistant Instructor in Agriculture, Christchurch, and there he soon made his first major contribution to the fund of written farming knowledge by reporting on an investigation into the cost of maintaining a 6-horse team on Canterbury arable mixed farms. This investigation opened the study of agricultural economics in New Zealand and is not only a work of merit but a report of historical importance.

Early Investigations

Investigations into the economics of various aspects of farming are now commonplace, but things were very different in the early 1920s. Farmers then were not used to meeting the wishes of curious young men by supplying information on their businesses, for farmers then paid no income tax and few kept account books. This was a new sort of inquiry, the purpose of which they did not understand; they had had no experience of the value of research work in agricultural economics. However, Mr. Fawcett by his determination and painstaking work showed farmers and administrators that knowledge of the economics of farming was important and that valuable data could be collected from properly conducted surveys.

Soon administrators and farmers were quite glad to have him investigate quite a number of problems: Problems of farming deteriorated land and those affecting the poultry and dairy industries. His major work in the 1930s was an investigation of the dairy industry and his surveys provided the foundation data for the deliberations and report of the Dairy Industry Commission set up in 1934 to examine the state of the industry. At a time when the economics of farming and marketing were becoming more and more acute Mr. Fawcett became recognised as a man whose opinions were sound, for they were based on data he had carefully collected and analysed. He was the logical choice for the post of Assistant Director-General in 1938. In this position he soon showed his administrative ability while engaged in planning to provide for carrying on the country's primary industries during a war which was known to be imminent. His work then and during the war was of immense importance to the country and it was largely due to his foresight and energy that farm production was so well maintained during the war.

Growth of Department

Mr. Fawcett's marked administrative ability has been evident in the manner in which during a period of rapid advancement in agricultural science and practice the Department has been developed under his guidance to maintain close liaison with the farming community and to meet the ever-expanding demand for information and service. The great advances made in all aspects of research and extension have been due in large measure to his activities and to the way in which he has inculcated in his officers the concept that their work is one of real public service.

Headed FAO Delegations

During the latter part of the war and since, Mr. Fawcett has been a leading figure in New Zealand's representation at meetings of various overseas agencies dealing with agricultural trade and production problems and assistance to underdeveloped areas. He attended the United Nations conference on food and agriculture at Hot Springs, Virginia, in 1943 and was a member of the first executive committee. From 1945 to 1949 he headed the New Zealand delegations to FAO conferences and in 1947 represented New Zealand at executive committee meetings and at the International Trade Organisation and GATT talks. In 1952, 1953, and 1954 he took a leading part in negotiations in London, Melbourne, and Washington regarding wool marketing; and in negotiations in London to determine the prices of meat under the bulk-purchase agreement with the United Kingdom and in the subsequent discussions leading to the termination of the agreement.

[*Spencer Digby*
Mr. E. J. Fawcett.

In 1955 he attended with the then Minister of Agriculture, Mr. Holyoake, the eighth session of conference of FAO at Rome and in that year and 1956 toured research and experimental stations in Italy, the United Kingdom, U.S.S.R., and U.S.A.

Mr. Fawcett was a member of this year's trade delegation to the United Kingdom headed by Mr. Holyoake. His last overseas duties were inquiry into the reasons for rejection of New Zealand boneless meat shipments to the U.S.A. and investigation of market requirements there.

Degree from Cambridge

Mr. Fawcett, who was born at Tadmor, Nelson, in 1892 and received his early education there, left New Zealand in 1915 with the Seventh Reinforcements as a 2nd lieutenant. He was wounded four times, the last time in 1917 at Passchendaele, where he won the Military Cross. He was discharged from the army with the rank of captain in 1918.

Shortly afterward he was awarded a Kitchener Memorial Scholarship tenable for one year, and obtained permission to enter Cambridge University. On the completion of that year Mr. Fawcett was granted a New Zealand Expeditionary Force Scholarship, and after 3 years' residence at

MR. FAWCETT TO RETIRE . . .

Cambridge took his B.A., specialising in agricultural science and economics.

While he was a student at Cambridge Mr. Fawcett spent his vacations in Germany with the American Army of Occupation at Coblentz, where he organised and supervised the production of T.B.-free milk from a farm taken over by the occupying authorities for the supply of their milk requirements.

In 1921 Mr. Fawcett married Miss Mildred Spencer, of London, who for some years had been secretary to the Quartermaster-General of the American Army of Occupation, the wedding taking place at Coblentz under the aegis of the Army of Occupation.

Mr. Fawcett returned to New Zealand in 1922 and completed his M.A. in 1925.

Mr. Fawcett was instructor in charge of the Gisborne-East Cape area from 1923 to 1925, when he was transferred to the head office of the Department as agricultural economist. In 1936 he was promoted to the position of technical liaison officer of the Department and represented it on various bodies. Mr. Fawcett became Assistant Director-General of Agriculture in 1938 and followed Mr. A. H. Cockayne as Director-General in 1943.

Mr. Fawcett has been Government nominee on many farming organisations and committees of inquiry. He was awarded the C.B.E. in 1951 for services to agriculture.

Main Wool Sales

The dates and venues of main wool sales are:—

10 January: Wanganui.
15 and 17 January: Auckland.
22 and 24 January: Napier.
29 and 31 January: Wellington.
12 and 14 February: Christchurch.
19 and 21 February: Invercargill.
26 and 28 February: Dunedin.
5 March: Timaru.
14 March: Wanganui.
19 and 21 March: Auckland.
26 and 28 March: Napier.
2 April: Wellington.
21 April: Christchurch.
26 April: Invercargill.
30 April: Dunedin.
15 May: Wanganui.
19 May: Auckland.
24 May: Napier.
28 May: Wellington.

Ram Fairs

The following are dates and venues of ram fairs:—

9 December—Central Hawke's Bay at Waipukurau.
12 and 13 December—Hawke's Bay at Hastings.
8 January—Masterton stud at Masterton.
9 and 10 January—Masterton flock at Masterton.
21 and 22 January—Feilding flock at Feilding.
6 February—Canterbury stud at Addington.
13 and 14 February—Canterbury flock at Addington.
14 February—Dannevirke at Dannevirke.
14 February—Ohura at Niho Niho.
5 March—South Otago at Balclutha.

Harvesting Short-rotation Ryegrass Seed

By W. V. HADFIELD,
Agronomist, Department of Agriculture, Timaru

SEED crops of short-rotation ryegrass present more harvesting problems than do those of perennial ryegrass. The plant itself is prone to shed its seed more readily than is perennial ryegrass and severe losses can occur if the crop is subjected to strong winds just before harvesting.

SHORT-ROTATION ryegrass is very uneven in its ripening and this makes the best time for cutting very difficult to assess. Furthermore if the crop is to be threshed from the swath or windrow, it must be left on the ground to mature for about 10 days. During this period losses from strong winds or heavy rain can be very considerable. Losses can also occur when the crop is being threshed. Certain standard pick-up attachments on headers can cause excessive shaking of seed, particularly with headers operating at excessive speeds. This has induced some farmers to make use of pea finger attachments to enable the crop to be lifted with minimum loss.

Most Efficient Method

Undoubtedly the most efficient method of harvesting is to cut with the binder and thresh from the stook. Less seed is likely to be lost by this method and well-conditioned seed can usually be obtained. Today this method is infrequently used and the standard methods now adopted are to cut with the mower or binder (with knotter removed) and thresh from the swath or windrow. Though these methods involve less labour, they bring with them some of the problems already outlined. Cutting the crop with the binder or windrower has the effect of concentrating the crop in a windrow. In this condition it may be able to withstand heavy rain with less seed loss than from a crop left in the swath after mowing.

Cutting and Threshing

Both the time of cutting and the length of time the crop is left to mature before threshing are important factors to be considered. Crops are generally not ready until the first maturing seeds have just started to be shed. The loss of this small quantity of seed is not of any real consequence in comparison with the better quality of the line as a whole.

Each year a number of crops appear to be cut prematurely and frequently they are not left in the swath or windrow long enough before being threshed. Where crops are cut early they require more than 10 days to mature; otherwise there is a danger of seed "sweating". This can readily cause excessive heating and discoloration, with consequent loss of quality and a reduction in the germinating capacity of the seed. After the crop has been cut it is in its most vulnerable state; yet the earlier a crop is cut, the longer it must be left to mature. Crops cut at the most favourable time need be left in the swath for only the minimum period of about 10 days.

During the 1955-56 season there was a general tendency to cut seed crops too early. This was understandable, as in most cases seed had started to shed, and changes in straw colour gave every indication of crop maturity. The season, however, was abnormally hot and dry and seed tended to dry off and be shed before being properly mature. External appearances in fact gave a false impression of the condition of the seed. In addition many crops were threshed too soon. There were therefore reports of badly conditioned seed and several crops were entirely ruined through excessive heating in the bag.

Position in 1956-57 Season

In direct contrast the 1956-57 season was one of excessive rainfall up to late December. Crops were heavily lodged and at cutting time gave every appearance of immaturity, stems having remained green and sappy, though seed was in fact at a stage of maturity fit for cutting. As a result a number of crops could reasonably have been cut sooner, and some seed was lost through late cutting. These examples show the difficulties in determining the best time for cutting.

During the 1956 and 1957 harvests an effort was made to correlate field estimation of time of cutting with laboratory examination of seed to assess its stage of maturity. Samples were taken from crops considered ready for cutting and the seed was examined under a microscope to determine its stage of maturity. This line of investigation will be continued in the hope that the maturity of short-rotation ryegrass seed crops may be judged with more precision. In the meantime seed growers should be on their guard against misjudging when these crops are ready to harvest.

A Topdresser that Mixes as it Sows

By J. L. DOUTRE,
Machinery Instructor, Department of Agriculture, Auckland

OVER past years many farmers have realised that it would be an advantage to have available a topdressing machine that would mix two or more fertilisers, or fertilisers and other materials, in any desired proportions and spread them in one operation.

THE fertiliser manufacturers and the merchants make up various standard mixtures, and in addition a farmer can have a specific mixture made up to meet his own requirements. These various pre-mixed preparations all have the disadvantage of inflexibility to meet varying requirements on different parts of the farm. The mixing of some fertilisers sets up chemical reaction that slowly causes loss of friability and sometimes loss of nitrogen. Moreover, the lime content of any such mixture prepared at a mixing plant is not covered by the Lime Transport Assistance Scheme.

These disadvantages are avoided by a new type of machine which the Department of Agriculture has kept under observation for several months in the Auckland district.

Principles of Machine

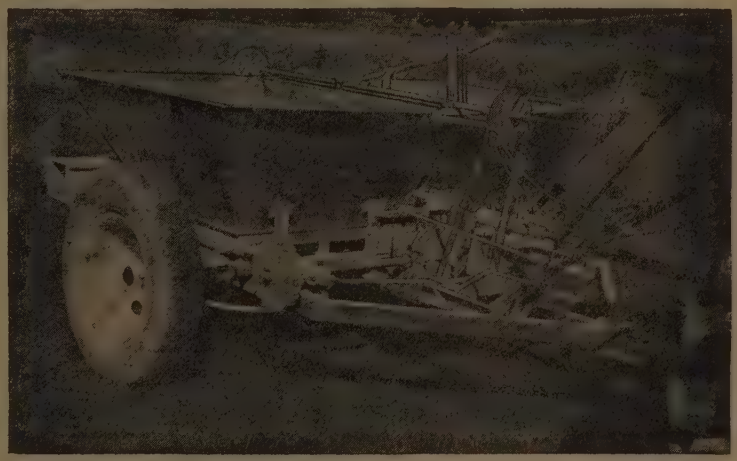
This topdresser incorporates three separate hoppers, the flow rates from which can be varied to govern the proportions of three materials in the mixture and the rate of sowing of the mixture. Fertilisers or trace elements, hormones, insecticides, weedicides, and seeds from the three hoppers are fed separately into a central mixing auger which thoroughly mixes the materials. The mixture is augered to the rear, where a high-speed fan blows it to each side, making a wide swath of quite uniform coverage.

Uses of Machine

The fertilisers, with the additives, are mixed as they are broadcast. Each paddock or crop can receive its individual requirements and special treatments can be incorporated at no extra handling cost. When the farmer desires he can dust the weeds or insect pests with weedkillers or insecticides at the same time as he topdresses the paddock, thereby reducing the number of trips over the area and the danger of lost potency due to pre-mixing. On the other hand, the machine can be used to sow these materials alone to combat these pests when topdressing is not desirable.

The machine is very versatile, as it can be used either as an ordinary top-

The machine in operation on a fairly rough paddock and making a good spread at 30 acres per hour.



A side view of the machine, showing the gear arrangement and control levers, which are within easy reach of the tractor operator from his seat.

Clear visibility of the hoppers and ease of control from the tractor seat allow good control of flow rate and enable the operator to decide when reloading is required.

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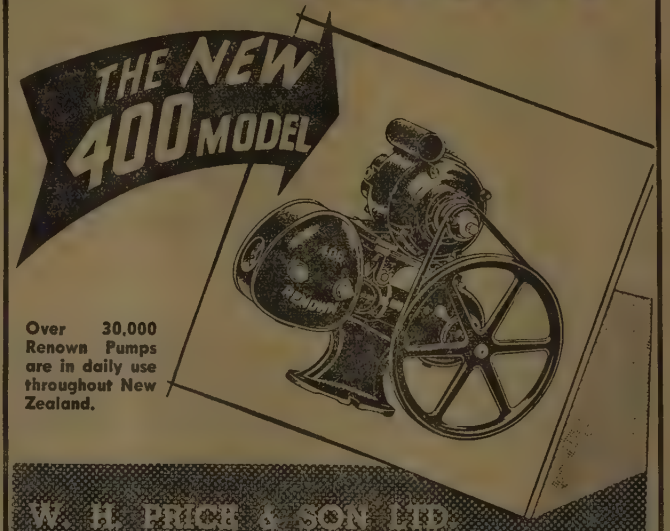

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Prospective Victim

. . . or farmer of the future?

Hydatids develop in children who live in rural areas and cause long illness and sometimes death.

Half-hearted, sceptical attitudes towards making offal safe for feeding to work-dogs is keeping hydatids active.

The key to hydatids control is to boil all offal you feed dogs. Pluck cut up and boiled for 30 minutes, is safe food.

You can dose and clear your dog of worms but it will quickly be *re-infested* unless its food is cleared of infection by *boiling*.

Never throw raw lungs, livers, hearts or spleen to your dogs. They become infected by eating hydatid cysts in those organs.

Burn or bury carcasses lying on your property, or at least remove and heat-treat or bury the pluck.

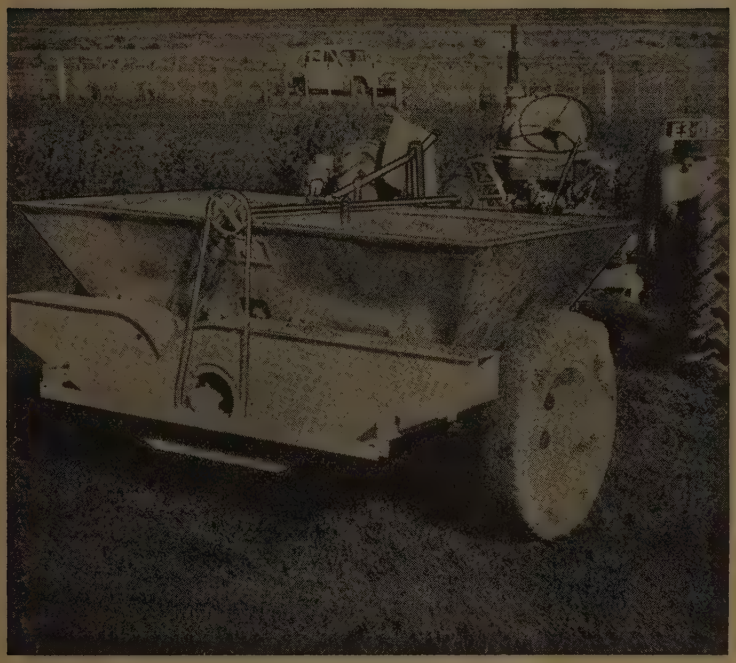
The best attack in hydatids is the breaking of the disease cycle by feeding only sound material to dogs. Reinforce this attack by dosing your dogs regularly with arecoline.

PROTECT YOUR CHILDREN from hydatids

- Insist on strict hand-washing after handling dogs and always before eating.
- Wash vegetables and fruit you eat raw.

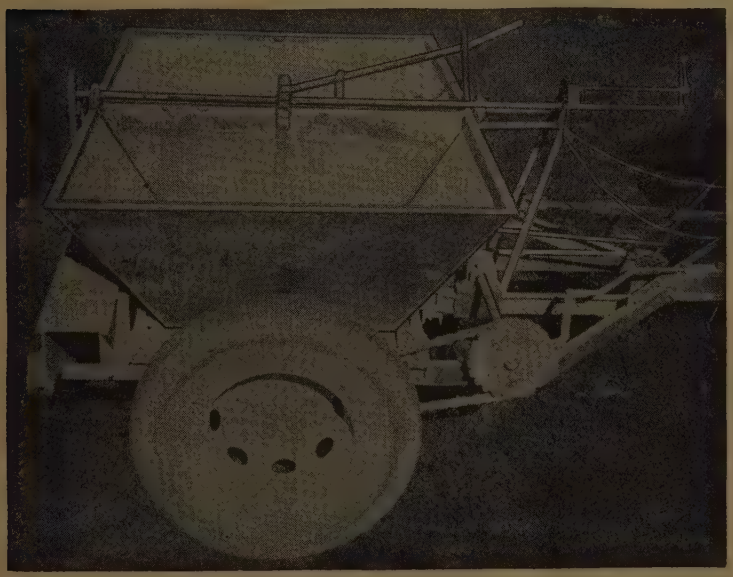
Condemned children, condemned livers, this is the price of apathetic hydatids control.

TOPDRESSER THAT MIXES AS IT SOWS



A rear view, showing the blower. The mixture is fed through the auger to the rear, where the high-speed fan blows it to each side, making a wide swath of quite uniform coverage.

▼ A side view of the machine. From his seat the driver of the tractor can instantly deflect the flow of material to right or left so that the steep hillsides and gullies can be covered from ground on which the implements can travel.



dresser or for spreading hormones, trace elements, or insecticides. It may be used as a broadcaster of some grass and clover seeds either mixed with fertiliser or sown from the small central box. This machine may seem too large for putting on dust at 5lb. or 10lb. per acre, yet tests have shown its effectiveness in sowing small quantities of such materials separately on 150 acres in 1 day. In many jobs dusting could replace spray equipment and the rate of application would be much faster.

Construction Features

The topdresser is designed as a trailer-type machine with three hoppers mounted side by side over two large rubber-tyred wheels 8ft. apart. The drive to the feeder mechanism is taken from the wheels to give a uniform coverage over the ground at any speed. The auger and fan at the rear of the machine are driven by a shaft from the tractor power take-off, so dispensing with the need for a separate power unit.

The hopper top is 4ft. above ground and is about level with a truck floor or loading ramp and is most convenient for filling with fertiliser. The low centre of gravity and wide track width give the machine greater stability and increased safety on hill country. The tractor driver can easily observe the flow of fertiliser from the large ½-ton hoppers and determine the quantities remaining in the hoppers or when to reload.

The swivel-type adjustable coupling makes the unit adaptable for use with all tractors with a suitable power take-off.

Spread of Materials

A spread 50ft. wide and even distribution are features which make the machine extremely fast, capable of covering 30 acres in an hour at an average speed of 5 m.p.h. From the tractor seat the driver by adjusting levers can instantly deflect the flow of fertiliser or other powdered materials to right or left so that steep hillsides or gullies can be covered from manoeuvrable ground.

Hedgerows at the edge of a paddock can be dusted from one side, or in a favourable wind the fertiliser can be spread to get coverage on only one side of the machine. Lumpy material can be handled easily, because the grinding action of the feed and auger and the high speed of the fan quickly pulverise all large particles.

Cost

This topdressing machine may be too expensive for the very small holder, but it definitely has a place on the large farm or for use by an agricultural contractor. Its uses can be spread over the year, and the speed of operation is such that large areas can be handled in a short time.

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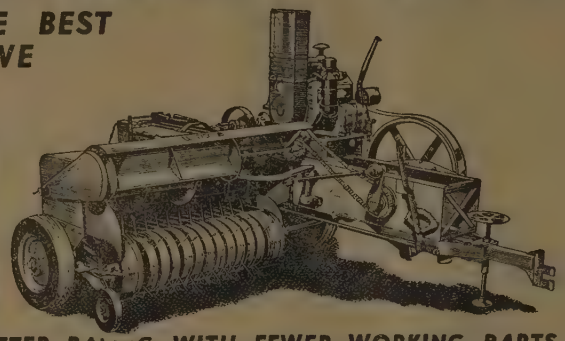

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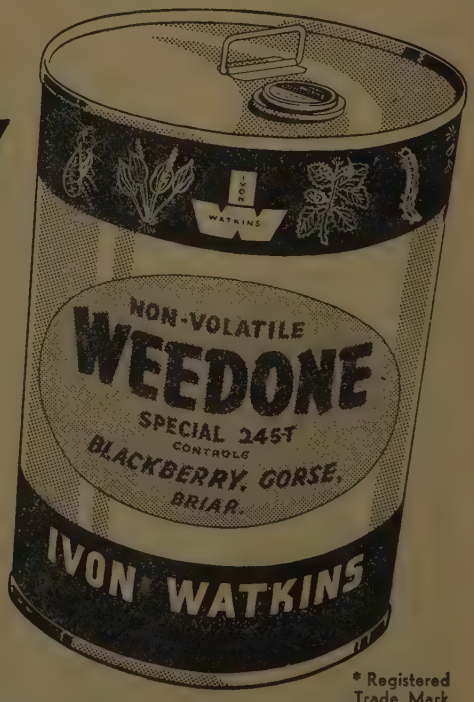

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Housing and Equipment for Laying Pullets

WITH the approach of Christmas and the holiday period the average householder has time to consider those jobs awaiting him in house and garden, and one intention may be to build a small poultry unit or to improve an existing one. New season's pullets are becoming available—perhaps for that new unit or to replace last season's birds, which are coming to the end of their laying season. This article by the Animal Industry Division of the Department of Agriculture discusses some points to be kept in mind when a fowlhouse is being built and describes the fittings needed in such a house. Some of the hints given may be found useful to improve old fowlhouses.

NO attempt will be made here to describe or recommend any particular type of fowlhouse; rather will an endeavour be made to describe a few of the more important features of a fowlhouse. Frequently a householder has ideas of his own about a house for his birds and wishes it to blend with its surroundings, thereby avoiding an ugly, untidy unit which becomes an eyesore in the garden.

Warning on Sites

The site chosen for the fowlhouse will vary with each garden, but a householder living in a city or town will be well advised to ascertain the local by-laws governing the keeping of poultry. Generally such houses must be built at a specified distance from the dwelling house and the neighbours' boundaries. Householders should be certain about by-law restrictions before they start to plan the poultry unit.

Outside Runs Not Essential

An outside run is not essential, and in fact it can generally be termed undesirable, as very often a run of very limited area only can be spared for the poultry. Such small runs ultimately become dirty, fowl sick, and unpleasant and are not only useless for the welfare of the birds but may very easily become a menace as a source of disease and even a breeding place for flies.

Laying birds can be kept satisfactorily in a properly constructed fowlhouse throughout the year. This is known as the intensive system of keeping poultry and is adopted by a large number of commercial poultry farmers.

Fowlhouse Floor Must be Dry

Much of the trouble in maintaining dry litter in a poultry house, particularly during winter, can be avoided if care is taken in siting the house properly when it is built. It is obvious to most people that a fowlhouse should not be placed in a damp, low-lying part of the garden, but fewer people realise the necessity for the floor of the poultry house to be at least 6in. above the level of the surrounding ground.

This means that the ground on which the floor will be made must be built up. Where the floor is to be concrete, a type strongly recommended, the ground underneath can be built up with rubble, fairly large stones, or any other material which will give a firm foundation and prevent moisture rising from the surrounding ground during wet weather. Coarse material under a concrete floor will prevent moisture rising, but earth or any close-textured material assists moisture to rise.

Rats under Floor are a Menace

When ground is built up with coarse material there is always a chance that rats may burrow under the floor. Perhaps attracted in the first instance by food fed to the poultry, rats soon discover that under the fowlhouse floor among the stones or rubble is a dry, warm place in which to lodge. For this reason it is a good idea to dig a trench 18in. to 24in. deep immediately round the floor or base of the poultry house. Into this trench put ½in.-mesh wire netting sloping outward or turned outward at the bottom of the trench and firmly fixed at the top to the house.

Such netting will usually stop rats from getting under the house. The netting should not be placed vertically, as a rat burrowing near the netting will follow it down until it gets under it. If it is turned outward, however, the rats burrow downward until they meet the part which is turned outward, and here they usually give up the attempt to get under the netting.

Floor Space per Laying Bird

For small units of 6 or 12 birds to be run entirely inside the house 5 sq. ft. per bird of floor space is recommended and with this space there should be no trouble in keeping litter in a satisfactory condition at all times. Where concrete is used for the floor it should be finished off as smoothly as possible, as this makes it much easier to clean the floor at the end of each season compared with the work required to clean a roughly finished surface.

Perches Should be Strong and Smooth

Perches are commonly made of 3in. x 2in. timber. Adequate perching room is desirable, but excessive perching space is unnecessary, particularly in a small house where it can least be spared. The comparatively small space a bird occupies when perching is surprising. It is customary to allow 6in. of perch for each light-breed bird such as a White Leghorn and 8in. or 9in. for heavy breeds such as Australorps, Rhode Island Reds, and heavy-breed crosses (for example, Australorp x White Leghorn).

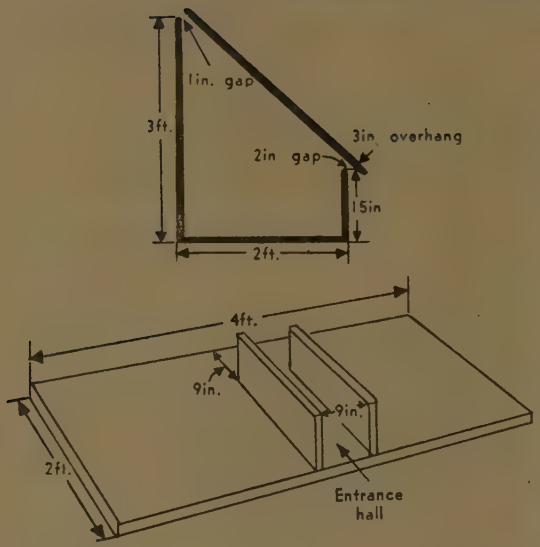
Where 3in. x 2in. timber is used it should be placed with the 2in. surface uppermost for the birds to perch on, the 3in. sides carrying the weight. Rough timber with knot holes should be avoided. Knot holes may well mean a broken perch one day, but just as important is the fact that knot holes are excellent places for red mites to collect in during daylight. Red mites are external parasites of poultry which live on the birds at night but retreat during the day into cracks and crevices in timber in the fowlhouse. Thus, smooth, clean timber is preferable for perches.

It is also recommended that the two edges on the top of the perch where the birds' feet rest at night should be rounded off, as square-cut edges to perches can be sharp and may injure a bird's feet. Also, a rounded edge is more comfortable for the birds and gives them an easier foothold.

Red Mites under Perches

If perches are fixed so that they rest on broad wooden bearers, a considerable part of the underside of the perch rests on the wooden bearer, and these two wooden surfaces coming together form an ideal shelter for red mites during the day. If a perch is lifted off a wooden bearer, generally a mass of red mites surrounded by greyish, scurfy material can be seen.

This undesirable state of affairs can be easily avoided. Perches can be fixed on metal uprights or they can rest in metal holders attached to the walls. (These holders can be bought at a reasonable cost.) Perches can be suspended from the roof with heavy-gauge wire, but with this method the perches are apt to be unstable and to swing, which can be disturbing to the birds.



Cross-section (upper) and plan of the communal two-sectional nest box with entrance hall as shown at right.

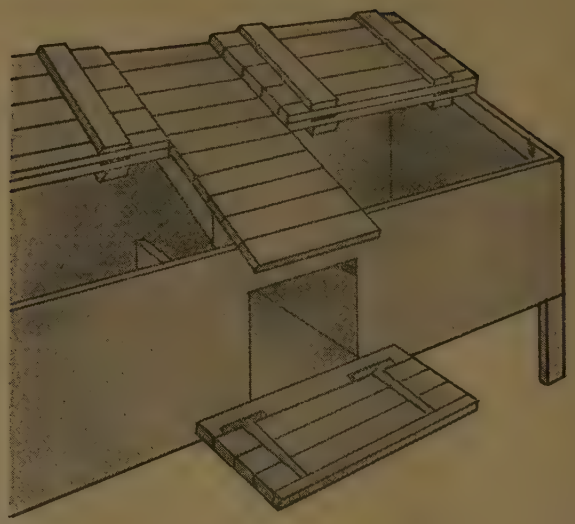


Diagram of the nest box.

Perches should be about 2ft. above the top of the litter. This means that they should be about 2ft. 6in. from floor level if 6in. of litter is maintained on the floor.

Good Nest Boxes Save Eggs

Poorly constructed or crude types of nest boxes can be a source of trouble and lead to a loss of eggs. If surplus eggs are sold, it is most desirable that they should be clean. The type of nest box used can be an important factor in obtaining clean eggs.

Perhaps one of the commonest troubles referred to the Department of Agriculture by household poultry keepers is egg eating. Eggs laid in open nests are attacked soon after a hen leaves a nest after laying. Egg eating is purely a vice and one that can develop quickly if eggs are broken in a nest box. Once birds have tasted a broken egg in a nest box it is only a short time before some of the birds are breaking the eggs with their beaks.

Eggs are broken in nest boxes which have solid floors and from which litter has been scratched or pushed out. All too often the board at the front and bottom of a nest box, which is intended to retain the litter, is only 3in. deep. A 6in. to 8in. board should be used to ensure that a good depth of litter can be maintained in the nest at all times.

It is advisable to use ½in.-mesh netting for the floor of the nest box, as this type of floor facilitates cleaning and lessens the chances of lice and flea concentrations in the boxes. However, a square of hessian should be placed on the netting to prevent the nest box material from constantly working out through the bottom of the nest.

The type of nest box illustrated above is designed to reduce egg eating and to promote clean eggs. The birds walk in the front opening and along the short passage, at the end of which they can turn into a box on either side. Wire netting is placed over the floors of the boxes but not the floor of the passage. Hessian is placed over the wire and covered with 4in. of sawdust. As these boxes are dark and closed in, birds are not interfered with and their eggs cannot be seen. Ventilation for these boxes is essential, and allowance for this is shown in the diagram.

Meteorological Records for October

Station	Height of station above M.S.L. (ft.)	Air temperatures in degrees (Fahrenheit)				Rainfall in Inches					Bright sunshine hours
		Approx. mean	Difference from normal	Absolute maximum and minimum		Total fall	No. of days of rain	Difference from normal	Maximum fall		
				Maximum	Minimum				Amount	Date	
Kerikeri	201	55.6	— 1.2	71.6	41.7	3.80	20	— 0.71	1.12	17	202
Auckland	160	56.4	— 1.0	68.0	45.1	5.12	22	+ 1.03	1.61	17	191
Tauranga	10	54.6	— 1.4	69.3	38.0	3.44	18	— 1.53	0.92	17	211
Ruakura	131	52.8	— 1.5	66.4	32.4	5.39	25	+ 1.26	1.06	17	172
Whakarewarewa ..	1006	51.4	— 1.6	68.6	32.8	4.36	18	— 1.02	1.19	17	185
Gisborne	13	54.9	— 0.6	72.6	35.5	1.83	10	— 0.60	0.61	20	229
New Plymouth ..	160	53.4	— 1.0	62.6	38.0	6.94	28	+ 1.31	0.98	11	153
Kariol	2125	47.2	— 1.0	61.6	29.2	9.33	24	+ 5.08	3.20	11	
Napier	5	55.8	— 0.7	76.0	37.4	1.98	8	+ 0.08	1.06	26	243
Wanganui	72	53.6	— 1.2	67.9	39.4	5.16	21	+ 1.88	1.03	11	173
Palmerston North ..	110	52.8	— 1.1	68.5	35.2	5.01	22	+ 1.45	0.87	11	152
Waingawa	340	51.6	— 1.1	67.0	32.2	2.54	16	— 0.42	0.55	2	199
Wellington	415	52.5	— 0.3	65.4	40.8	4.19	17	— 0.04	1.03	3	186
Nelson airfield ..	5	52.1	— 0.1	68.2	29.9	3.62	18	+ 0.28	0.84	12	224
Blenheim	12	53.2	— 0.5	69.4	31.3	2.74	10	+ 0.54	0.70	9	234
Hokitika	15	49.4	— 1.6	61.7	31.7	14.53	23	+ 3.51	1.63	16	135
Hanmer	1270	49.2	— 1.4	71.0	27.0	4.06	19	+ 0.16	0.91	2	202
Christchurch ..	22	52.9	— 0.2	74.2	31.2	1.05	10	— 0.90	0.25	14	225
Ashburton	323	52.4	+ 0.0	75.0	33.0	1.67	14	— 0.75	0.58	4, 19	205
Timaru	56	52.2	— 0.5	75.9	33.7	2.24	11	+ 0.31	0.70	10	188
Alexandra	520	50.4	— 2.0	73.8	30.5	1.83	15	+ 0.61	0.65	1	166
Taieri	80	49.4	— 1.7	68.4	30.2	1.98	15	— 0.08	0.46	13	124
Invercargill airfield ..	0	47.6	— 1.4	68.9	31.3	6.24	24	+ 2.76	0.84	30	122
Chatham Islands ..	140	50.2	+ 0.3	61.2	34.1	1.68	14	— 0.25	0.34	4	

Successful Pasture Establishment in Central Otago

By R. C. SCHOFIELD,
Instructor in Agriculture, Department of Agriculture, Alexandra

Native fescue tussock association (right), the original cover of the country developed, and the first stage of development to greenfeed (left).

THERE are thousands of acres of partially improved and unimproved country in Central Otago on which production could profitably be increased. Development of much of this country, which is virtually denuded of vegetation, depends basically on building up fertility to a stage where the land will support an improved pasture. The growing of greenfeed, fertilised with superphosphate, and its grazing by stock during both autumn and spring have brought about considerable improvement, to an extent that successful pasture establishment is assured.

FEW plants or associations of plants are capable of relatively high production on this denuded country. Therefore, to see if advantage could be taken of the increased fertility and to determine the plant species capable of reasonable production and of withstanding drought and severe winter conditions, an investigation was carried out in the Dublin Bay district, near Wanaka.

The soil, which is a sandy loam with shingle outcrops overlying gravels, is somewhat similar to many Central Otago soils. The result of this investigation would have a very wide application throughout Central Otago, which is subject to winds from all quarters and is extremely dry during summer.

The basis of the investigation was the introduction of a suitable legume. At the same time the possibilities of various grasses were considered. The legumes selected and their rate of sowing were lucerne 12lb. per acre, Montgomery red clover 3lb., white clover 3lb., subterranean clover 4lb., and sweet clover 4lb. Cocksfoot 3lb., *Phalaris tuberosa* 3lb., tall oat grass 10lb., tall fescue 10lb., and meadow fescue 10lb. were the grasses chosen. They were sown in various combinations with the legumes.

As a comparison a mixture was sown containing perennial ryegrass 10lb., short-rotation ryegrass 5lb., cocksfoot 4lb., white clover 2lb., Montgomery red clover 2lb., and subterranean clover 4lb., a total of 27lb. of seed an acre. The trial was sown on 1 October 1953 with 2cwt. of superphosphate per acre and observations were continued for three seasons.

The result of this investigation showed that of the grasses cocksfoot was vastly superior. Its ability to produce under the drier conditions, to respond to the limited rainfall, and to recover after drought make it the most suitable grass available. *Phalaris tuberosa*, though suitable in the dry periods, did not produce as well or recover as soon as cocksfoot.

Lucerne established after three seasons of greenfeed and being grazed by stock.

The ryegrasses and meadow fescue failed miserably. Tall oat grass proved to be a relatively low producing plant of questionable palatability. It was slow to establish and slow to recover after drought. It could have greater use on less fertile and inaccessible country. Tall fescue was extremely slow to develop and after three seasons was just beginning to show up.

Of the legumes subterranean clover was established successfully in spring and, provided critically dry conditions do not exist at seed setting, it will continue seasonally, but this is always doubtful in this climate. Montgomery red clover and white clover established readily, but there was a considerable mortality of plants each year, thus reducing the ability of this species to maintain itself under the normal dry conditions.

Lucerne is unquestionably the best of the legumes. It is the first to show growth in spring and the first to recover in autumn. With cocksfoot it formed the superior association over the whole period observed. In the early stages cocksfoot showed dominance, but this dominance was reversed in the second season, and by the third season a satisfactory relationship between these plants was achieved.

This investigation indicates that after the feeding off of greenfeed crops sown with superphosphate to improve the fertility, pasture can be established successfully, and that the best seeds mixture is lucerne at 8lb. to 10lb. and cocksfoot at 3lb. with 2cwt. of superphosphate per acre. The result of this trial is a worthwhile increase in feed production and carrying capacity, and the practices adopted could be applied on thousands of acres of Central Otago.

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WEED IDENTIFICATION

By D. I. GLUE, Instructor in Agriculture, and L. J. MATTHEWS, Weeds Research Officer, both of the Department of Agriculture, Wellington

This is the first of a series of articles illustrated in colour to appear in the "Journal" from time to time in which identification and control of various weeds will be discussed.

VARIEGATED THISTLE

VARIEGATED thistle (*Silybum marianum*) is a serious weed of waste places and open pastures, particularly in coastal areas. It is often prevalent on soils that dry out badly in summer, such as unconsolidated sands or light stony soils. Though variegated thistle can cause severe nitrite poisoning in cattle, and to a less degree in sheep, its seriousness as a pasture weed is due mainly to the fact that it is the largest and quickest growing of the common thistles.

IN favourable situations variegated thistle reaches a height of 7ft. with a rosette spread of 3ft. The spikes are so large and strong that stock give the plant a wide berth.

Variegated thistle is annual or biennial in habit. Seedlings appear in autumn and grow rapidly through winter and spring. As the plant develops, its large rosette leaves lie close to the ground and completely smother out all other nearby vegetation. Seeds are set in summer, and, though equipped with a hair "parachute" (a pappus), are so large that distribution by wind is relatively ineffective, and most of them fall on to ground that has been bared at the bases of parent plants. Conditions are thus created which are ideal for the perpetuation of the infestation.

To break the cycle it is necessary to do two things:—

1. Kill existing thistles before they can smother out the surrounding pasture sward or have had a chance to set seed.

The control of seedlings and small rosettes is readily carried out by a blanket application of water-soluble MCP and 2,4-D preparations at rates as low as ½lb. of acid equivalent per acre. Spraying should be done as soon as most of the seedlings have struck and are competing with the pasture. Spraying should not be delayed until the plants are fully established, as they build up resistance as they approach maturity. A heavier rate of weedkiller per acre must then be used and greater clover damage occurs, both from smothering by the large plants and the action of the weedkiller. In most districts control measures may be taken as early as July or August. In some areas autumn spraying is also practised. Variegated thistle is also readily controlled by aerial spraying, the usual weedkiller being a solution of 2,4-D ester in diesel fuel oil. Water-soluble preparations are less satisfactory for aerial application.

2. Encourage the development of a dense sward containing vigorous, high-producing pasture species.

Variegated thistle seedlings are unable to grow through a vigorous, dense sward, and in practice chemical control has proved of little use unless followed by sward improvement. This may take the form of complete pasture renewal, or the thickening up of the existing sward by applying phosphate, lime, potash, or molybdenum as required, the incorporation of better grass and clover species by oversowing or the use of the sod seeder, and the avoidance of pasture-management practices such as pugging or overgrazing which lead to a weak and open sward.

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The *Other Man's* Point of View on Wool

Some Things Wool Buyers Take into Account

By J. E. DUNCAN,
Wool Supervisor, Department of Agriculture, Wellington

CHARACTERISTICS of wool which influence the bidding of wool buyers were discussed in the first section of this article, which appeared in last month's "Journal". In this concluding section of the article hereditary and acquired faults in wool and possible means of overcoming them are described.

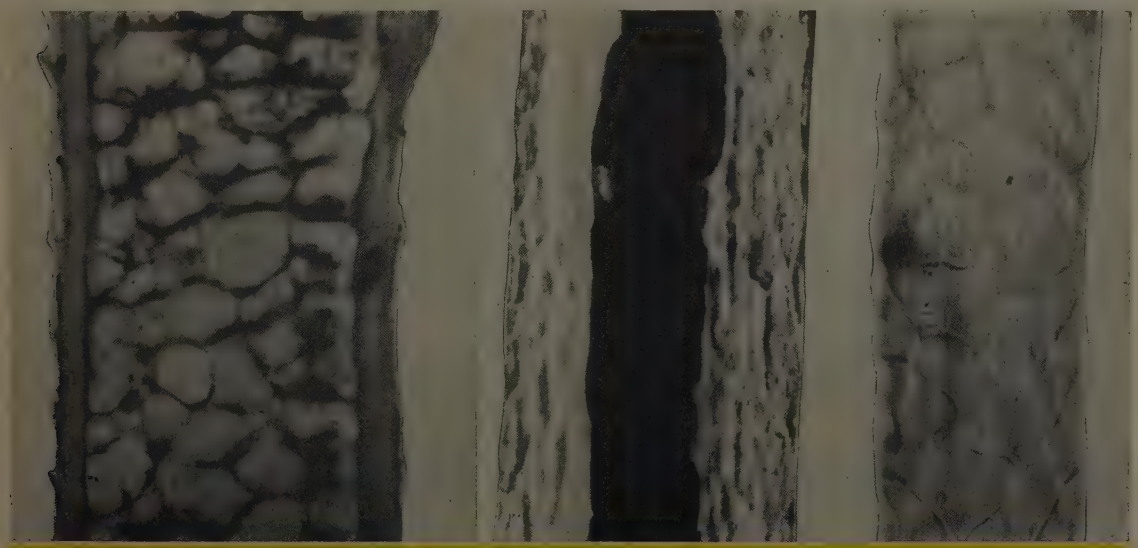
VERY few fleeces are entirely free from faults. The New Zealand Wool Commission prepares annually a statistical analysis of wool offered at New Zealand auction sales. One category is listed as "spinners and super topmaking", which means it is superior and any faults in it must be very minor ones. For 1956-57 the category comprised 66,289 bales out of a total of 1,055,663 or 6.28 per cent. The remaining 93.72 per cent. of wool offered at auction, therefore, is regarded as faulty to a varying extent.

During the commandeer period, when wool was classified into the seven grades AA-E, an average of only 0.1 per cent. or about 1 bale in 1000, went into the top (AA) or fault-free style grade. At first this may appear a pretty gloomy picture, but it must be borne in mind that many of the faults are relatively minor and matter little if at all to certain buyers who want the wool for purposes not affected by particular shortcomings.

It seems to be customary to divide wool faults into two broad categories: Hereditary faults, which fundamentally are due to the breeding of the animal. Acquired faults, which are impressed on the animal by its environment; that is, are due largely to management. This division into two groups is merely a matter of convenience and some faults can be included under both headings. A number of faults such as break, various stains, unevenness, harsh handle, and cotts have already been mentioned, but for completeness they will all be listed and some of the remainder dealt with more fully.

A. Hereditary Faults

1. Hairiness (medullation, including hairy-tipped and hairy-britched fleeces).
2. Kemp fibres.
3. Pigmentation (black or brown fleeces, spots, or scattered fibres).
4. Variation in fibre diameter:
   (i) Variations in count throughout the fleece.
   (ii) Variation in diameter between individual fibres in the staple.
   (iii) Variation in diameter along the fibre.



These fibres are all built in different ways from the same substance, keratin. From left they are: A kemp fibre, a hairy fibre, and a pure wool fibre.

LEFT TO RIGHT:

Caky yolk.

Fleece rot (green).

Fleece rot (blue).

LEFT TO RIGHT:

Pink rot.

Pink tip.

Canary stain.

LEFT TO RIGHT:

Phenothiazine stain.

Bloom dip.

Dip stain.

The staple on the left shows a severe break or weak zone (arrows) where the fibres have been thinned by some severe check received by the sheep. The staple on the right is quite sound and free from breaks.

5. Variation in fibre length:
   (i) Variation in fibre length from one portion of the fleece to another.
   (ii) Variation in length between individual fibres within the staple.
6. Harsh handle.
7. Indistinct crimp (mushy, characterless, or fuzzy wool).
8. Lightweight fleeces.
9. Tendency toward break and cotting.

B. Acquired Faults

1. Break in wool (includes tenderness).
2. Cotts.
3. Fleece rot (combined effects of long-continued wetting and bacterial action).
4. Yolk stain (may be associated with caky yolk).
5. Canary stain.
6. Pink rot.
7. Pink tip.
8. Tippiness (frequently mistaken for hairy tip).
9. Mycotic dermatitis (also known as "lumpy" or "woody" wool).
10. Damp wool (wool which has been pressed when damp).
11. Urine (pizzle) stain.
12. Dingy wool (contamination with sand, earth, dust, etc.).
13. Log or charcoal stain (sometimes referred to as bush stain).
14. Fern stain.
15. Inkweed stain.
16. Vegetable matter (seeds, burrs, sticks, bracken, straw, etc.).
17. Ked (or "tick") stain.
18. Dip stain.
19. Disinfectant stain.
20. Phenothiazine stain.
21. Bluestone stain.
22. Shed or pen stain.
23. Unscourable brands, raddles, tupping paints, crayons, etc.
24. Jute contamination.
25. Lightweight fleeces.

A 1: Hairiness

Pure wool and hairy wool are both made of the same substance, keratin, but the essential difference is that pure wool fibres are solid, whereas hairy ones have a hollow core or medulla; hence this fault is sometimes referred to as medullation. Most buyers object to hairy fibres mainly because of dyeing troubles. The hollow, air-filled medulla causes these hairy fibres to appear a lighter shade after dyeing than solid wool fibres. In many fabrics they show up as conspicuous blemishes. Hairy fibres also have a tendency to be coarser than their pure wool neighbours, so may tend to stick out on the surface of the yarn and cause the fabric to be harsh handling if these fibres are numerous.

Where medullation is well developed the fibres are easily identified, even in the fleece, where they have a chalky white appearance in contrast to the wool. If only a little medulla is present, it will not be conspicuous and the buyer is unlikely to penalise it. About 20 years ago the benzol test was very popular for detecting medullation and it certainly did the job, as even a single hairy fibre would show up among thousands of pure wool ones. Probably for this reason the importance of hairiness was much over-emphasised for a while. Even a slight trace of hairiness is admittedly undesirable in a stud ram, but among flock ewes, if it takes a benzol test

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to find it, the buyer will not be worrying about it.

Some sheep have a tendency to grow a hairy tip to the fleece and this can be quite a bad fault at times. Though the rest of the fibre may be 100 per cent. pure wool, a well-defined hairy tip will cause the whole fleece to be down graded. A fleece may also be classified as hairy tipped when the staples have long, tapering tips much subject to weathering. The general effect is similar to that produced by medullation, as the harsh, chalky-looking tips will still dye unevenly owing to degradation due to the effects of weathering. The buyer does not need to make fine distinctions; both types of hairiness are equally undesirable to the manufacturer.

A 2: Kemp

Kemp fibres are an extreme form of hairiness with the medulla so large that the fibre is reduced to a hollow shell filled with air bubbles like the shaft of a feather. Most wild sheep originally had two fleeces or coats, an undercoat of fine, soft, short fibres to conserve warmth, and an outer coat of longer, stronger fibres frequently pigmented for camouflage and mechanical protection. A widely held theory is that the fleeces on modern sheep have been developed from the ancestral undercoat and that odd kemp fibres which show up are a throwback to the outer coat. This could well be so, as kemp fibres are usually much coarser and often longer than the surrounding wool, and unlike the wool they are shed and replaced by new kemp fibres at intervals while the wool keeps on growing. The stiff, white hairs on the face and legs of Romneys, for example, are also kemps but not normally troublesome.

Kemps are undesirable to most manufacturers for the same reason as hairy fibres, only more so. The exceptions are carpet manufacturers who can handle this sort of wool and some woollen mills which make fabrics of the Harris tweed type, where kemps appear on the surface of the cloth to give it its typical appearance and handle.

Fortunately the tendency to produce hairy fibres and kemps is strongly inherited, so that culling and selection are rapidly effective in reducing and finally getting rid of this trouble. The presence of kemps is the reason for keeping eye-clips or wiggings out of crutchings, and why it is frequently recommended that the leggings (socks or stockings) should not be shorn off at shearing time, when they can easily get mixed with good fleece wool, much to its detriment.

A 3, 4, 5, 6: Pigmentation, Unevenness of Fibre Diameter and Length, and Harsh Handle

See pages 437 and 438 in the November "Journal".

A 7: Indistinct Crimp

Variously referred to as mushy, characterless, fuzzy wool, etc., indistinct crimp is a common fault and may be partly environmental. The writer has always regarded a well-defined, regular crimp as a sort of outward manifestation of inward goodness—such wool generally has little structural fault, and recent research work at Princeton in America has shown that crimp makes a definite contribution toward desirable manufacturing properties.

A fleece is unlikely to be classified as AA or a spinner's type unless it has plenty of character, and character is an indefinable blend of crimp, colour, handle, and a number of intangibles, but mainly crimp. Lack of crimp or well-defined crimp seems to be inherited, but a fleece that would be well crimped under good conditions may be spoilt to a greater or less extent by hard conditions such as lack of feed and long-continued wet weather, particularly in the stronger wools, for example, Romney. The moral is obvious: A grower should do as much as possible by mating, selection, and culling to secure character in his wool and should do his best to retain it by avoiding over-stocking.

A 8: Lightweight Fleeces

Similar remarks to those above apply to lightweight fleeces with the difference that fleece weight seems to be fairly strongly inherited in Merinos, yet comparatively weakly inherited in Romneys. Not much research has been done on other breeds. This means that with Merinos there is a much better chance of increasing fleece weight by breeding methods. With Romneys good feeding seems to play a more important role in producing heavy fleeces, and even sheep which have the inherited ability to produce heavy, well-crimped fleeces will not do so unless well fed.

A 9: Break and Cotting

Break and cotting are chiefly acquired faults and will be dealt with as such, but there is evidence that the tendency to show a break or produce cotted fleeces is inherited. Some breeds and individual sheep seem to have the ability to resist these tendencies.

B 1: Break and Tenderness

Break and tenderness have already been dealt with (page 435 in the November "Journal"). Break is probably the most common single fault in New Zealand wool. A survey carried out on many thousands of breeding ewes some years ago by P. R. McMahon and A. E. Henderson showed the percentage of fleeces showing some degree of break to be: Romney and crossbred 38.1; three-quarterbred 47.8; and Corriedale and halfbred 49.7. They also found that ". . . in practically all of the groups fleece weight consistently becomes less as degree of 'break' increases". Prevention is obviously the policy to follow, but not so easy to apply, particularly when ewes are so prone to show a break in the wool associated with lambing, and ill-thrift in hoggets has an equally bad effect on their wool.

B 2: Cotts

Cotted fleeces have to go through an additional opening process on special machines, which adds to the cost of handling and inevitably results in some extra fibre breakage. Other things being equal, cotts are therefore worth less per pound than open fleeces.

Though the tendency toward cotting is inherited, environment also plays an important part. First, a proportion of fibres receives such a severe check that they not only show a bad break but are actually shed. (Occasionally all fibres are shed and the whole fleece comes off.) Mechanical movements and continued wetting and drying of the fleece result in the loose fibres felting with the rest of the fleece to produce a cott. The greater the check is the more fibres are likely to be shed and the worse the cott.

A typical set of circumstances to give this result would be an old ewe, partially gummy, doing her best to feed twin lambs during a hard season. There would be every chance of her producing a heavily cotted, light fleece. Strong-woolled sheep of the Lincoln, Leicester, and Romney types seem to be more prone to cotting than finer-woolled ones.

B 3: Fleece Rot

R. H. Hayman in Australia, A. E. Henderson at Canterbury Agricultural College, Lincoln, and others have done considerable work on fleece rot and have shown that it can be produced artificially by keeping the fleece wet for extended periods. Put briefly and simply, the sequence of events seems to be that the long-continued wetness irritates the skin in some way and causes a weeping which forms a pasty mess in the fleece, an ideal breeding ground for bacteria, particularly as there is some warmth to hasten the process.

Some sheep seem to be more prone to this trouble than others and according to Henderson it is not so much a question of the fleece getting wet, but how long it stays wet; in other words how quickly it dries. At Lincoln it has been found that certain types of fleeces are almost immune from this trouble, probably because they do not stay wet for long. There may be considerably more to it than this and research is still progressing.

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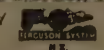
Authorised  *Distributors*

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The bacteria which flourish under these conditions produce colour as a by-product, frequently green, hence the name "green-rot" of wool. The colour may also be red or brown and sometimes even blue and various intermediate shades. The wool fibre itself is not rotted away and most of these colours will scour out, but a badly affected fleece looks unattractive and is certainly unlikely to bring top price in spite of its other merits.

The trouble is worse in wet seasons and in the present state of knowledge preventive measures are not practicable.

B 4: Yolk Stain

Yellow stains in the fleece may or may not be scourable and because of the difficulty of distinguishing one kind from the other, buyers can hardly be blamed for treating them all alike—with caution. Some of the stronger-woolled breeds, such as Romney, Leicester, and Lincoln, seem to produce quite a proportion of fleeces which show a distinct yellow throughout the fleece. This yellow colour is in the suint and can readily be scoured out. There has been considerable speculation as to its nature, but no finality has been reached. Yellowish fleeces frequently go darker on long storage, but the colour will still wash out.

Caky yolk, which at times occurs in specks, lumps, or well-defined bands in the fleece, is also generally of various shades of yellow, but may vary to brown or orange-brown. It too will scour out, provided there are not further complications. Some people, however, confuse yolk stain or caky yolk with canary stain, which is quite a different thing.

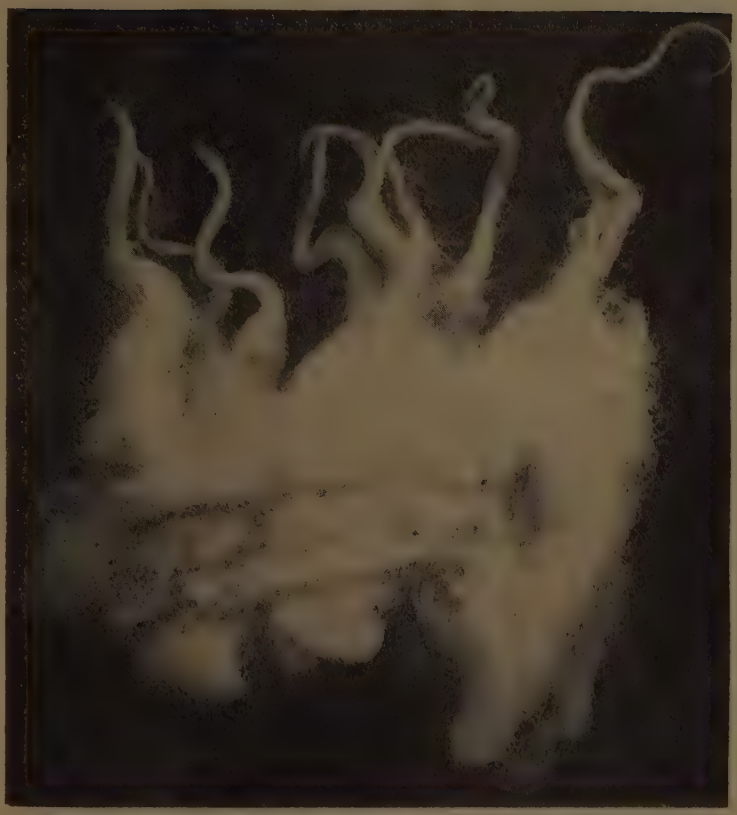
B 5: Canary Stain

Canary stain is generally a deeper, more vivid yellow than yolk stain, hence its name. As it is quite unscourable, it is of much greater economic importance. Considerable research work done in Australia showed that canary stain was usually associated with high temperatures and humidities and could be produced artificially by covering the sheep with waterproof covers in hot weather. The high temperatures and humidities in the fleece below the cover soon produced canary stain.

B 6: Pink Rot

Pink rot is another bacterial trouble which is particularly prevalent in wet seasons. It differs from ordinary fleece rot, however, in that the wool fibres are actually destroyed. R. Waters at Massey College in 1932 was able to culture the organism and reproduce the trouble on wool.

The typical appearance is a matted patch of rotted wool fibres stuck to one another and usually pink, but varying in depth of shade. The patch varies in size from quite small to as much as 9in. or possibly more across. The wool is usually quite rotten and can be crumbled to dust between the fingers, making it useless for manufacture. It is advisable to remove any affected wool if it is noticed during skirting.



Very "tippy" wool. Staples of this sort become badly weathered, lead to undue waste in manufacture, and fail to take dye evenly.

B 7: Pink Tip

Pink tip is quite a different condition from pink rot. Pink tip is confined to the tips of the staples and is of little or no commercial significance. It seems to be brought about by a combination of weathering breaking down the tips of the staples and micro-organisms acting on this degraded wool and producing the pink colour. The writer has noticed it particularly on Romney lambs and unshorn hoggets in the North Island where the well-defined "lamb tip" seems to be very susceptible.

B 8: Tippiness

Tippiness has already been mentioned. (See page 438 of November issue.) It is a problem mainly in the stronger-woolled breeds and does not give much trouble in the blocky-tipped, finer breeds such as Corriedale, halfbred, and Merino, or for that matter the Down breeds. The reason it is mentioned here again under acquired faults is that the damage to the tips of the staples is acquired by weathering, though the tippiness itself is a hereditary fault.

B 9: Mycotic Dermatitis

Mycotic dermatitis has been recognised in New Zealand only since 1931, though it probably occurred long before. The descriptive alternatives of "lumpy" or "woody" wool are most appropriate, because the serous exudate from the skin glues the wool fibres together into a hard, tough mass. It is a skin trouble caused by a fungous organism related to ringworm. It is the skin irritation which causes the weeping exudate. The organism seems to show definite preferences for young, fine-woolled sheep and to be more likely to affect them on the back than elsewhere. The incidence of the trouble varies greatly

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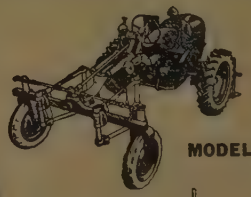

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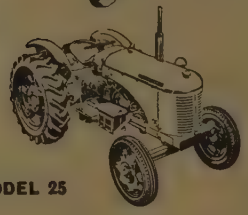

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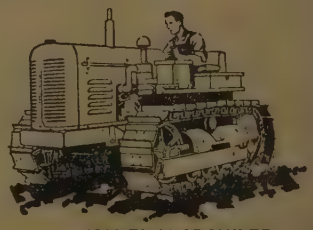

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from season to season and seems to be aggravated by abnormally long-continued wet conditions.

Though sheep may be so badly affected that it is almost impossible to shear them, the number affected throughout New Zealand is so small that the trouble is certainly not a major economic problem. Probably because of this very little research work has been done on it, and the treatment still recommended is to spray or dip affected sheep with a dilute solution of copper sulphate (bluestone); 1 part of bluestone to 500 parts of water by weight. Even with this weak solution the copper absorbed by the wool will probably affect its dyeing properties; but there is no alternative treatment. Several outbreaks among Merino hoggets have been successfully checked in the early stages by such dipping.

B 10: Damp Wool

If greasy wool is pressed when it is damp, it is likely to deteriorate in colour, and in bad cases the fibres will be weakened or even crumble to dust. With long-continued dampness the wool may easily become mildewed. When the damage is severe there is usually evidence of considerable heating having taken place, but it is a fallacy to suppose that there is considerable risk of spontaneous combustion. After extensive inquiries the writer has been unsuccessful in finding a single, well-authenticated instance of greasy wool catching fire by spontaneous combustion, though this has frequently happened with low-grade slipe wool (pie wool) in freezing works and aboard ship. In these cases it is the mutton fat with which the wool is contaminated that causes the fire hazard.

It is not always possible to avoid shearing some sheep when they are wet or shorn wool becoming wet from, say, a leak in the woolshed roof, but all damp wool should be spread out to dry thoroughly before being pressed. This will obviate any deterioration in the colour of the wool and subsequent trouble with the broker, who will not offer wet wool for sale, as buyers are rather sensitive about paying for unnecessary quantities of water at 5s. per pound.

B 11: Urine or Pizzle Stain

Urine stain is normally found on the belly wool from wethers and rams and the stained portions should always be removed from bellies immediately they are shorn. Leaving stains on bellies for removal later results in more wool being spoilt and if stained bellies are pressed, this simply ensures that the whole bale is down graded. Urine stain varies in colour from yellow through deepening shades of brown to almost black, and cannot be removed by scouring; hence the lower value of the stained wool. Ewe fleeces may have some urine stain round the britch. The stains should be removed at skirting and, as they are usually wet, spread out to dry before being bagged or pressed. Even small quantities can be sent in for binning.

B 12, 13, 14, 15: Dingy Wool, Log or Charcoal Stain, Fern Stain, and Inkweed Stain

See section "Colour" in the November issue (page 437).

B 16: Vegetable-matter Contamination

Seeds, burrs, bracken, sticks, straw, chaff, and a host of other vegetable materials find their way into wool, on or off the sheep's back. All are undesirable and the tighter they cling to the wool the more objectionable they are in the eyes of the buyer; hence his particular aversion to clover burrs, which unravel in the wool and cling to it with a multitude of tiny hooks. The reason that these contaminants are so disliked is that they irritate the skin of the wearer if they are in clothing fabrics and, because vegetable matter will not take dyes designed for wool, they show up as blemishes.

Some mills will not touch "seedy" wool at any price; others have the necessary equipment to handle it and are willing to buy at a discount, which must be big enough to cover the extra processing costs. When the amount of seed is small it can frequently be removed mechanically by special heavy steel rollers which crush it flat so that it comes out in the carding process. If there is too much seed to be eliminated by this simple means, the wool must be carbonised. This involves treating the wool with dilute sulphuric acid and then baking it, which converts vegetable matter to carbon, hence the name. The carbon can then be crushed and beaten out of the wool without appreciable damage to the fibres if the process is properly controlled.

As with a number of other faults the first remedy is prevention. If this is not practicable, but the "seed" is confined to the points and edges of the fleece, it can be skirted off. If there is a lot of it through the whole clip, nothing can be done.

B 17: Ked or "Tick" Stain

The term "tick" stain is a misnomer, as the common parasite affecting sheep in New Zealand is the ked, which is an insect, not a true tick. The stain is caused when infestation is heavy and the excreta of the numerous keds gives the wool a dull, leaden colour, accompanied by a peculiar, unpleasant, musty odour like bad mushrooms. This stain is often not completely removed by scouring, but it will not trouble the owner of a well-managed and properly dipped flock.

B 18, 19, 20, 21, 22, 23: Dip, Disinfectant, Phenothiazine, Bluestone, Shed, and Brand Stains

See section "Colour" in the November issue (page 437).

B 24: Jute Contamination

For generations wool manufacturers have complained about wool becoming contaminated with jute fibres, which are hard to see and do not show up until the wool takes the dye and they do not. The jute either rubs off the inside of the wool pack into the wool or gets into it when the bale is cut open for inspection by the buyers. Bits of twine, sacking, and wax matches getting mixed up with the wool have a similar bad effect.

Much thought and ingenuity have gone into this problem, but no really satisfactory solution has yet been found. All sorts of improved wool packs have been suggested, ranging from all-wool, paper- and rubber-lined jute, paper and wire, to all paper, yet none has survived the hard test of normal purchase and use. Packs were either too dear or had shortcomings.

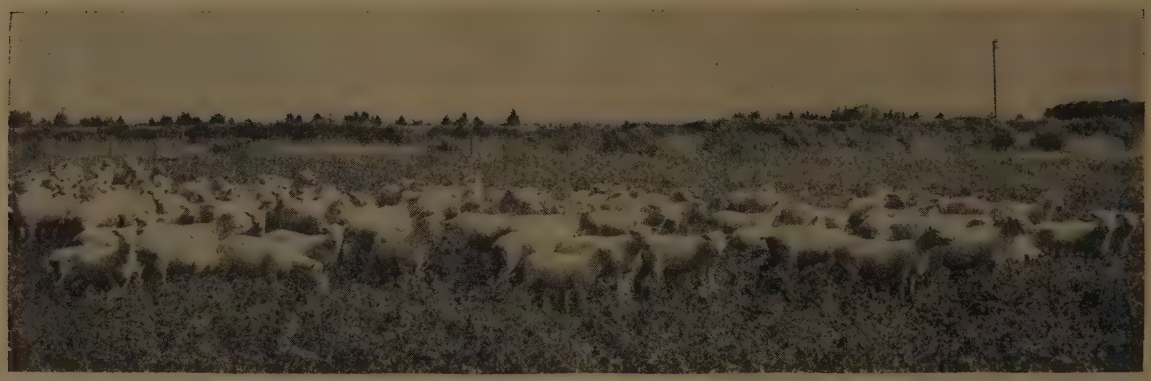
If wool manufacturers really want to solve the jute-in-wool problem, it seems that they will have to offer a worthwhile monetary premium for wool marketed in special packs. Meanwhile the more enlightened wool growers will continue to do their best by turning packs inside out and shaking loose jute or flax fibres from them and by seeing that their labour force is careful with ends of twine and wax matches if these are still used.

B 25: Lightweight Fleeces

Though light fleeces are economically undesirable, lightness might not be considered a fault in the usual sense, because a fleece could be light in weight without being noticeably faulty in other respects. In practice, however, it is common for light weight to be associated with such faults as break, tenderness, and cotting. This is quite logical, because semi-starvation will reduce the weight of wool grown and any extra lean periods will be reflected in distinct breaks and often cotting, which in its turn may easily lead to the troubles associated with water remaining in the fleece; that is, fleece rot and its variations (see page 553). This train of events can largely be avoided by adequate feeding, particularly with the stronger-woolled breeds, and ample proof of this is available. (See details of experiments given under "Effects of Feeding on Wool" on pages 427 and 428 of the November issue.) To quote another actual case:—

Over 4 years a farmer on the east coast of the North Island reduced his winter carrying capacity from 9555 to 8297, a reduction of 1258 sheep or 13 per cent., and during this same period put on more cattle. Despite this his wool clip **increased** by 3312lb.

Care of Livestock during January



Contributed by the Animal Research Division

RAPE should not be grazed until the leaves show a purplish tinge. "Unripe" rape does not fatten so quickly and seems to "scald" more readily. Best results are probably obtained by grazing in breaks which last the lambs about a week. It is false economy to keep lambs on a break until the last leaf is eaten; they should be moved on while they are still getting a full feed, and the paddock can be cleaned up with ewes. Run-offs have little to recommend them and, unless they contain good pasture, they will depress the lambs' rate of growth. If hay is fed, it must be of the very best quality.

LAMB-FATTENING FODDERS

Thousand-headed kale is splendid lamb-fattening fodder, but because it is relatively unpalatable, it must be managed properly. It must always be fed in small breaks and grazed only lightly before the lambs are moved on to the next break. A run-off should never be used. Treated in this way, the kale makes excellent regrowth and can be regrazed several times and, if necessary, grazing can be extended into autumn and winter.

Weaning is an important event in the life of a lamb and special care at this time will be well repaid. Longwool lambs should be shorn and all others crutched. If the weather is wet, lambs should be given a full dose of 20 grammes of phenothiazine at weaning; otherwise drenching may be postponed until rain falls.

LAMB WEANING

If fattening crops are not available, lambs should be drafted into "clean" paddocks. Lambs should never be weaned into paddocks in which ewes and lambs have been grazed during the previous month. Unless very good paddocks of spelled pasture are available, hoggets should be spread thinly over as large an area as possible.

After lambs have been weaned the ewes should be gone through carefully to select those which require culling. Feet and wool should be examined carefully. Special attention should be paid to udders and teats, and ewes should be culled if they have defective udders or very large or damaged teats, as the lambs of such ewes often die from starvation before they are a week old. Provided ewes are in reasonable condition and have sound udders and good fleeces, they should be retained. Even "gummy" ewes will rear satisfactory lambs on good pasture.

EWE CULLING

Lambing percentage increases with age, reaching the highest level at 5 to 8 years. Many ewes on fat lamb farms could well be kept for 1 or 2 years longer, but fat ewes which have not reared a lamb should be culled. Ewes should be kept on low rations for 2 months after weaning to prevent their becoming over-fat.

Campaigns for foot-rot eradication should be started as soon as the lambs have been weaned. Once foot-rot has been eradicated from a flock it does not recur unless it is reintroduced from outside. Farmers should follow the recommendations in recent "Journal" articles on this subject.

FOOT-ROT ERADICATION

Serious lameness can be caused by cattle eating hay heavily infested with ergot. Such hay can be easily recognised by the black ergots which replace the seeds of ryegrass and other grasses. Where ergot is known to occur hay should be made before the grasses have time to seed.

ERGOTISED GRASS MAKES DANGEROUS HAY

Modern dips are so effective that the eradication of lice and ticks should be quite feasible. Best results, however, will be achieved only if the instructions for mixing and replenishing dips are followed accurately. Carelessness in dipping can cause disastrous losses. If sheep are dipped off shears, the shear cuts may become infected and deaths from blood poisoning may occur. These can be prevented by vaccinating the sheep with blackleg vaccine at least a fortnight before dipping them. The vaccine is available at a reasonable price, and Department of Agriculture Veterinarians or Livestock Instructors should be consulted about its use.

SHEEP DIPPING

Sheep that eat St. John's wort become sensitive to sunlight and develop scabs on the ears, face, and back. If sheep in such conditions are dipped, they take convulsions and may be drowned. If possible, sheep should be grazed on country free from St. John's wort for several weeks before dipping. If this is not possible, they should be dipped on dull days only.

ST. JOHN'S WORT MAKES DIPPING DANGEROUS

Pasture Management and Pest Control

Seasonal Notes by the Extension Division

MEASURES for the control of insect pests should be put into operation before damage is so severe that the pastures or crops cannot recover satisfactorily. Late application of control measures is expensive in that the greatest damage is done before the treatment has its effect. These notes include details of the best treatments for some common pests of crops and pastures.

SUMMER PASTURE MANAGEMENT ON DAIRY FARMS

MUCH pride is taken by the grassland farmers of this country, especially the dairy farmers, in the efficiency of their pasture management, and rightly so, but a look round any dairying district in late summer will show striking contrasts in pastures from farm to farm, indicating clearly that there is still something very much wrong with the pasture management on many dairy farms.

On some farms the pastures are clean and free from roughage and weeds and are ready to respond with fresh growth to autumn rains. On such farms it will be found that in addition to as much surplus grass as possible being conserved as silage and hay early in the season, the mower has been used through summer to help the stock to maintain good control and so prevent large areas from getting away to flower and seed. To be effective in promoting more leafy growth into and through summer the mower must be used early and must be kept in use so long as grass growth tends to get away from the stock.

The value of this control lies in keeping the whole pasture producing good cow feed while there is enough moisture, in preventing smother of the clovers, and in keeping out weeds by maintaining a close ground cover. On far too many farms some of the surplus spring growth gets away because too small an area is cut for hay and silage, and in addition summer control is left to the stock entirely, with the result that pastures fall off in production quite early in summer, the top growth smothers the clovers, and when this growth dies off later in the season the ground is left bare and open to invasion by weeds. Moreover the unpalatable grass species tend to increase and autumn growth is very much delayed. More use of the mower in the summer control of pastures would pay good dividends on such farms.

—C. J. HAMBLYN

* * *

INSECT CONTROL IN CROPS AND PASTURES

SEVERE damage to crops and pastures from grass-grub, porina, aphid, and army worm can be prevented by early application of modern insecticides by ground machine, aeroplane, or helicopter.

PORINA AND GRASS-GRUB

The treatment for porina and grass-grub is 2cwt. per acre of DDT superphosphate containing 20lb. of 100 per cent. para para isomer DDT to the ton of phosphate. It should be applied in February to April to close-grazed pasture by ground machine, helicopter, or low-flying aeroplane on a still day. On new pastures the material should be broadcast when sowing down or at the latest at the first topdressing after sowing. Stock should be kept off until rain has fallen to ensure that the DDT reaches the ground. Treatment is effective for 3 years or more.

APHID AND WHITE BUTTERFLY

Cruciferous crops in all stages are attacked by aphid and white butterfly. Spraying from the ground or helicopter of ½lb. of lindane in 10 gallons of water is effective. When applied from a low-flying aeroplane on a still day this material is effective also against white butterfly but not against aphid unless ground turbulence is absent or very slight. A second treatment against aphid may be necessary in 3 weeks.

ARMY WORM

Last year damage to crops and pastures by army worm was severe in many districts. Control measures should be adopted as soon as damage is apparent. Army worms move fast, entirely devouring succulent crops and defoliating pastures and maize. Both DDT and dieldrin are effective in controlling army worm. Dieldrin gives a quick kill, but does not have as long a residual or protective effect as does DDT. For maize ½ gallon of 40 per cent. p.p.i. DDT in 6 gallons of water per acre is recommended for application from the air. Other crops and pastures may be treated from the ground or air with DDT at ½lb. p.p.i. per acre as a spray or 1lb. as a dust. To ensure satisfactory distribution sufficient diluent is necessary to enable a total quantity of at least 12 gallons of spray or 8lb. of dust to be applied per acre. If dieldrin is used, 1½ pints per acre should be applied with adequate dilution to ensure coverage.

IMPORTANT WARNING

Because most insecticides are lethal to bees, it is now an offence to spray leguminous and cruciferous crops containing flowering plants with such chemicals between 1 September and 31 March without first obtaining a permit from the Department of Agriculture.

—H. de O. CHAMBERLAIN

* * *

HARVESTING OF SMALL SEEDS

IN these days of lower seed prices the small seed grower has to ensure that he has a sufficient yield of good-quality seed to make harvesting worth while. With ryegrass crops, therefore, it is well to make use of the pre-harvest testing service for blind-seed disease made available by the Department of Agriculture. This year testing will start in the South Island at Timaru on 10 December. When prices of the ryegrasses are low it is hardly worth the gamble and cost of harvesting lines moderately to severely infested with blind seed and so of low viability.

Time of cutting is important: Cutting when the seed is too immature results in loss of weight of seed harvested, but on the other hand cutting at the ripe or over-mature stage will mean seed lost by shaking. The old test of pulling a few heads through the hand or sweeping a hat across the crop is still the best guide—if a few seeds come away when this is done, harvesting may be started. Where harvesting is delayed because of unfavourable weather it is wise to cut in the cooler parts of the day when the seed is not so readily shed. Once cut, the seed must be left to condition in the windrow (a process which takes longer with immature seed), or heating in the bag can result.

With white clover also time of cutting is important, but it is difficult to gauge the maturity of this crop in wet seasons when continued clover growth produces several crops of seed of different maturities. If there is rain after cutting and the leaf grows up through the swath, the aerator is a very useful implement for lifting the swath gently and putting it back on the stubble without the loss of seed. An alternative method is to cut under the swath with the mower. Great care should be taken in threshing the crop to examine the sample of seed, not only at the start but also throughout the day, to see that damage is not being caused by incorrect setting.

—P. R. BARRER

MALATHION

Simplifies fly-control

MALATHION is fatal to flies—it acts quickly and residues remain effective up to 21 days.

- **It is easy to apply and economical to use**
- **It provides extra protection to field personnel**
- **It kills flies that are resistant to previously effective insecticides**
- **It kills flies in larval (maggot) form too**

MALATHION insecticides are becoming increasingly recognised as the most practical answer to the problem of fly control. Because of their superior insecticidal performance, they are being used with remarkable success for controlling flies in cowsheds, pigsties and calf pens, stables and sheep barns, poultry houses, on manure and garbage heaps, around fences, ponds and water troughs and other places where flies breed in large numbers. Where "resistance" to other insecticides is a problem, change over to an insecticide containing MALATHION.

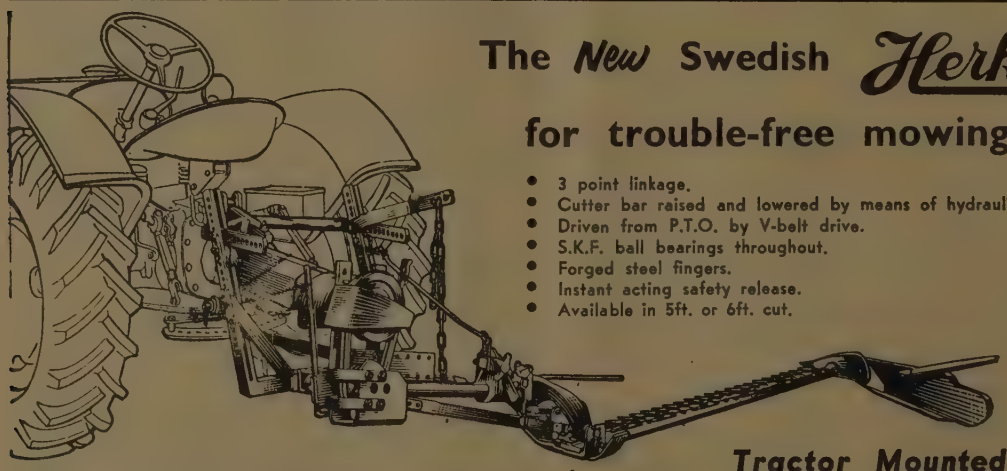
MALATHION is available in insecticide preparations produced by leading insecticide manufacturers

CYANAMID 50 1907 1957

Further information on Malathion in Australasia may be obtained from:
Cyanmid Australia Pty. Ltd., at 59 Halstead Street, Hurstville, New South Wales,
or C/o G. B. O'Malley, 377 Little Collins Street, Melbourne.

CYANAMID OF GREAT BRITAIN LTD

FARM AND HOME DIVISION, BUSH HOUSE, LONDON, W.C.2



The *New* Swedish *Herkules*

for trouble-free mowing

- 3 point linkage.
- Cutter bar raised and lowered by means of hydraulic lift.
- Driven from P.T.O. by V-belt drive.
- S.K.F. ball bearings throughout.
- Forged steel fingers.
- Instant acting safety release.
- Available in 5ft. or 6ft. cut.

Tractor Mounted

FITS DIRECT TO HYDRAULIC LIFT

Swedish precision manufacture—first sold in N.Z. in 1912. Sales and service facilities from Northland to the Bluff.

HERKULES TKT

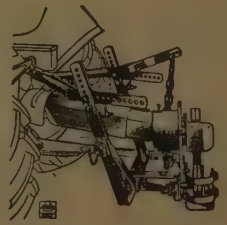
TRACTOR MOUNTED MOWER

N.Z. Importer:

FARM EQUIPMENT CO. LTD., WANGANUI

Write for name of local dealer.

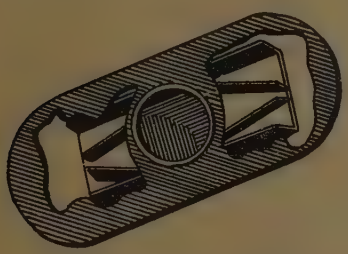
The new tractor-mounted Herkules TKT mower is fitted direct to the arms of the hydraulic lift of the tractor—fits all standard tractors.



Use of Bee Escapes for Removal of Honey

BEE escapes have been used in the beekeeping industry for many years for the removal of honey from the hives, but do not appear to have been brought into general use. In this article J. E. Rodie, Apiary Instructor, Department of Agriculture, Hawera, explains how bee escapes can save time in handling of equipment and give other advantages.

THE Porter bee escape is a device which will allow bees to pass through a self-closing gap which is made up of two V-shaped flexible spring prongs that spread under the slightest pressure and allow the bees to pass through at the apex. After the bees pass through the springs the points fly back into position and prevent the bees from returning.



Double-end Porter bee escape.

Bee escapes are made with single and double ends and may be used singly, but usually two are mounted on a board. The board has the same measurements as the supers used on the hives and is usually made of some type of hardboard with narrow ⅜in. timber nailed on one side only, at the ends and sides, so that when the board is placed in position a bee space is provided on the upper side.

Advantages

Bee escapes have advantages over any other method of removing the honey crop. They are clean, do not impair the flavour of the honey, are quick in use, and cut down working hours and costs. When properly used they overcome the problem of flying bees in the honey house, which are usually taken in when honey is removed from hives by other methods.

Super of honey clear of bees being removed for extracting.

Method of placing escape board in position.

Disadvantages

Placing bee escapes on hives in out apiaries may involve the beekeeper in more travelling, though if apiaries are situated in a confined area extra milage can be practically eliminated, as will be explained later. If there is any brood whatsoever in the supers which are to be removed, the bees attending this brood will not pass down through the bee escape, which then becomes ineffective. This fault may be caused, however, by the beekeeper over-supering his hives, so that the brood nest is extended into the supers, or by adverse climatic conditions at critical periods after supers have been added to the hives, so that the queen has extra unnecessary top space in which she may lay eggs.

Good beekeeping practice—adding supers only as required to accommodate the bees and providing room for surplus honey only when a steady nectar flow is imminent or in progress—will keep the queen down in the brood nest area and overcome this fault.

Use of Bee Escapes

The usual practice is to place escapes on the hives in the evening or late afternoon of the day before the honey is removed for extracting. They may also be put on in the morning when most of the field bees have left the hive; either method appears to be satisfactory.

Extra travelling may be avoided when honey is removed from out apiaries by placing the escapes on hives on the furthest apiary first and using them again on the following day

in the apiary next in line on the way home with the first load of honey, and so on.

Placing Escape Boards in Position

On arrival at the apiary first place an escape board ready for use against each hive. To place each board in position loosen the top honey super with a hive tool and with one hand tilt the super upward just enough to apply a little smoke to quieten and drive the bees back. Then tilt the super up at an angle sufficient to slide the escape board in as far as it will go, with the bee-space side upward. Lower the super and complete the operation by aligning the super and escape board on the hive.

If the beekeeper has assistance, he may find it quicker for one operator to use the smoker and handle only the escape board while the other handles the super and makes the final adjustment.

Either way the operation can be carried out quickly and efficiently without unduly disturbing the bees.

Removal of Honey

The next day an early start can be made and if desired the honey supers removed early in the morning and a full day put in on extracting. Removing the supers of honey early will in no way cause a major disturbance, if they are handled quickly, which can be done and the job completed in a very short time.

It is advisable, however, to place escape boards on only as many hives as the beekeeper can manage adequately in one operation when removing the honey crop, particularly in autumn, when robbing is prevalent.

Vaccination Against Contagious Abortion

So that vaccinating officers can arrange the work efficiently, applications by farmers for vaccination of their calves against contagious abortion should be forwarded by 4 January. Members of veterinary clubs should apply to the secretary of their club and other farmers should apply to the nearest Livestock Instructor of the Department of Agriculture or private veterinary surgeon.

The charge for vaccination is 2s. per calf, irrespective of the number, and the closing date for applications for dairy calves is 14 January and for beef calves 31 July. Applications to Livestock Instructors must be accompanied by a cash payment of 2s. per calf. Application forms can be obtained from any Livestock Instructor.

Chalk Brood Disease of Bees

THOUGH chalk brood has not been reported in New Zealand before, there is no doubt that it has been present for some time. Samples recently discovered in Southland have been examined by T. Palmer-Jones, Principal Research Officer, Department of Agriculture Animal Research Station, Wallaceville, and confirmed as being chalk brood disease. In this article D. W. A. Seal, Apiary Instructor, Department of Agriculture, Invercargill, describes the disease and ways to combat it.

CHALK brood is not a serious disease of bees and can be avoided by good beekeeping methods, but its presence to any extent indicates that conditions generally in and about the hive could be improved for the general comfort of the bees.

This brood disease is caused by a fungus called *Pericystis apis*. The spores of the fungus find honey bee larvae a suitable medium for growth, and soon after larvae have been infected the threads of the fungus (hyphae) permeate all the larval tissues and cause death of the larvae. They die soon after the cells are capped.

Symptoms

Chalk brood is easily recognised, as the dead larvae harden into white, chalky mummies. Finally, they lie loosely in the cells and are easily removed. Sometimes the bees themselves will remove a number of the mummified larvae and generally attempt to clean out the cells by taking off the cappings. Both worker and drone brood larvae may be affected.

Treatment

Chalk brood will not gain a footing in a good working colony with a high morale. Any badly affected combs should be removed and burnt. If an affected colony fails to throw off the disease on its own, it should be strengthened by the addition of young bees and hatching brood and encouraged by feeding 50 per cent. sugar syrup.

Chalk brood can be avoided by not allowing the bees to winter in too large a brood chamber. One that is badly ventilated and only partly occupied during winter provides an excellent resting place for the spores of the fungus. When the brood nest expands in spring or early summer and covers combs harbouring these spores the larvae are liable to infection.

Up to the present chalk brood has been located only among the darker races of bees, particularly in Europe. This may be due to their tendency to excessive swarming, which tends to leave too large a brood chamber for the remaining bees to care for properly.

One authority states that not much can be done to prevent infection of a few larvae by spores carried into the hive by the field bees if conditions are right for their germination and growth. Serious spread of the trouble can be avoided, however, by closing down the hives for winter with not more than two boxes for the brood nest and stores and keeping the hives clear of long grass in winter and spring to prevent dampness and allow adequate ventilation for maximum comfort of the bees.

Radio Broadcasts to Farmers

RADIO broadcasts to farmers will be given during January as follows:—

1XH Hamilton, Mondays at 12.33 p.m. and Tuesdays at 8 p.m. (Frankton stock market report), Wednesdays at 12.33 p.m. (report from Ruakura Animal Research Station), Thursdays at 12.33 p.m., Fridays at 8 p.m. (stock sale review).

1XN Whangarei, Mondays at 8 p.m. (Northland livestock report and "Farming for Profit"), Wednesdays at 8 p.m. ("Farming for Profit"), and Fridays at 8 p.m. ("News for the Farmer").

1YA Auckland, Mondays at 12.33 p.m., Tuesdays, Wednesdays, and Thursdays at 7.45 p.m., and Fridays at 6 p.m. and 7.45 p.m.

1YZ Rotorua, Mondays at 12.33 p.m. (Waikato stock market review), Tuesdays at 7 p.m. (Hamilton stock market report), Wednesdays at 7.15 p.m. (Pig Council talk on fourth Wednesday of every other month at 12.33 p.m.), Thursdays at 12.33 p.m.

2XA Wanganui, Wednesdays at 8 p.m. (Wanganui stock sale report). Thursdays at 8 p.m.

2XG Gisborne, Tuesdays at 8 p.m., Fridays at 8.2 p.m. (Gisborne stock market report).

2XN Nelson, Thursdays at 8 p.m.

2XP New Plymouth, Thursdays at 8.1 p.m.

2YA Wellington, Mondays at 7.15 p.m., Thursdays at 12.33 p.m., Fridays at 7 p.m. (Feilding stock market report).

2YZ Napier, Tuesdays at 12.12 p.m. (Hawke's Bay orchardist session), Tuesdays at 7.10 p.m., Wednesdays at 7.15 p.m. (Hawke's Bay-Poverty Bay livestock market report), Thursdays at 12.33 p.m.

2ZA Palmerston North, Mondays at 12.33 p.m., Fridays at 8.45 p.m. (Feilding stock market report).

3XC Timaru, Mondays at 8 p.m. (Pleasant Point stock market report), Tuesdays (fortnightly) at 8 p.m. (Temuka stock market report), Wednesdays at 8 p.m., and Saturdays at 10.30 a.m.

3YA Christchurch, Mondays at 12.20 p.m., Wednesdays at 7.15 p.m. (Addington stock market report), Thursdays at 12.33 p.m. and 7.15 p.m.

3YZ Greymouth, Mondays and Thursdays at 12.33 p.m.

4YA Dunedin, Mondays at 12.33 p.m., Tuesdays at 12.33 p.m., Wednesdays at 12.33 p.m. and 6.50 p.m. (Burnside stock market report), Thursdays at 12.33 p.m.

4YZ Invercargill, Mondays at 12.33 p.m., Tuesdays at 12.33 p.m. and 7.15 p.m. (Lornerville and Gore stock market reports), Wednesdays at 12.33 p.m., and Thursdays at 12.33 p.m.

District Committees for Facial Eczema Warnings

THE Department of Agriculture's field advisory work for facial eczema control has been reorganised and field officers of both the Animal Industry and Extension Divisions, in co-operation with farmers, will carry out the work in future on a district basis. This article enumerates North Island districts, the constitution of local committees, and the radio stations and newspapers through which warning advice will be issued.

METHODS for the control of facial eczema are fully described in the Department's Bulletin No. 388, "Losses from Facial Eczema Can be Prevented", which all North Island livestock farmers should study. Facial eczema advisory committees, consisting of officers of the Animal Industry and Extension Divisions and local farmers, have been set up to carry out advisory work so that farmers may be fully informed on control measures, to issue warnings when seasonal conditions are likely to favour facial eczema outbreaks, and to issue advice at critical periods when immediate action is required to safeguard flocks and herds. Farmers should discuss any individual or local problems with the officers of their district committees.

In the list below only the names of Departmental officers on each committee are given, but arrangements are being made to add two or more farmers to each committee so that adequate district advisory services are secured.

Final details of the constitution of each committee and local advisory information will be given in the newspapers and through the radio stations enumerated for each district.

In each section of the following list the members of the district committee are given first, the counties covered by the committee second, the radio stations serving the district third, and the newspapers circulating in the area fourth. The designations of Departmental officers have been abbreviated as follows: Livestock Instructor, L.I.; Instructor in Agriculture, I.A.; Veterinarian, V.; Fields Instructor, F.I.

The areas in which the facial eczema advisory committees operate.

1 KAITAIA

J. A. Smith, L.I. H. G. B. Halliwell, I.A.	Mangonui North Hokianga
1XN Whangarei 1YA Auckland	"Northern Advocate" "New Zealand Herald"

2 KAIKOHE

W. J. Burns, I.A.	Bay of Islands South Hokianga Whangaroa
1XN Whangarei	"Northern Advocate" "New Zealand Herald"

3 WHANGAREI

C. Ensor, V. R. S. M. Mason, L.I. C. E. Ballinger, I.A.	Whangarei
1XN Whangarei	"Northern Advocate" "New Zealand Herald"

4 DARGAVILLE

G. T. McNally, L.I. W. B. Wards, F.I.	Hobson West Otamatea
1XN Whangarei 1YA Auckland	"New Zealand Herald" "Northland Times"

5 WARKWORTH

W. J. Finch, L.I. C. M. Blick, F.I.	Rodney East Otamatea
1YA Auckland 1ZB Auckland	"New Zealand Herald"

6 AUCKLAND

G. Wallace, V. N. D. Harrison, L.I. G. Haddow, I.A.	Waitemata
1YA Auckland 1ZB Auckland	"New Zealand Herald"

7 PUKEKOHE

G. Durham, V. A. M. Doggett, L.I. D. M. Merry, I.A.	South Franklin
1YA Auckland 1ZB Auckland	"New Zealand Herald"

NEW HOMELITE DIRECT DRIVE CHAIN SAW WITH FLOATING POWER

Here's new help for every farmer . . . the *floating power* of the new Homelite EZ direct drive chain saw gives you more cutting for your money. Its direct drive and full 5 horsepower give you peak performance with less effort on your part. Because it weighs only 19 pounds, it goes anywhere with ease . . . cuts any wood from any position, up, down, right, left.

- Weighs only 19 pounds
- Full 5 horsepower

Other models available include: 7-29 7-horsepower one man chain saw: Model 17, rugged, versatile year-round, gear drive chain saw.

Enquire at your local Homelite dealer or write

CABLE-PRICE CORPORATION LTD.

Auckland, Wellington, Christchurch, Dunedin, Hamilton, Rotorua, Napier. 1·7a

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A Johnson's Fence means

SECURITY FOR VALUABLE STOCK

Johnson's English Wire, drawn with the skill of 150 years' experience, is protected by patented Hot Dip Galvanising. This ensures long life in New Zealand's climatic conditions and it is particularly resistant to the corrosive action of salt-laden air.

Johnson's 12½ gauge Super Dreadnought is economical for high country. It yields 1,458 yards to the hundredweight as compared with 546 yards for 8 gauge and has equivalent breaking strength.

JOHNSON'S ENGLISH FENCING WIRE

MANUFACTURED BY: RICHARD JOHNSON & NEPHEW LTD. MANCHESTER, ENGLAND.

OBTAINABLE FROM STOCK & STATION AGENTS & HARDWARE MERCHANTS EVERYWHERE.

SOLE NEW ZEALAND AGENTS:

JOSEPH NATHAN & COMPANY (N.Z.) LTD.

WELLINGTON AUCKLAND CHRISTCHURCH SP.543A

8 PAPAKURA

A. Fisher, V.	Manukau
E. Nelson, L.I.	North Franklin
H. McM. Bull, I.A.	
1YA Auckland	"New Zealand Herald"
1ZB Auckland	

9 THAMES

W. L. Stringer, L.I.	Coromandel
G. L. Banfield, I.A.	Thames
1YA Auckland	"New Zealand Herald"

10 PAEROA

I. S. McLaren, L.I.	Ohinemuri
G. L. Banfield, I.A.	Hauraki Plains
1YA Auckland	"New Zealand Herald"
	"Hauraki Plains Gazette"
	"Thames Star"

11 HAMILTON

G. R. Mackintosh, L.I.	Waikato
J. R. Murray, I.A.	Raglan
	North Waipa
1XH Hamilton	"Waikato Times"
	"New Zealand Herald"

12 MORRINSVILLE

L. P. Wells, L.I.	Piako
S. D. Clay, I.A.	
1XH Hamilton	"New Zealand Herald"
1YZ Rotorua	

13 TAURANGA

M. B. McKenzie, L.I.	Tauranga
A. V. Allo, I.A.	
1YA Auckland	"Bay of Plenty Times"
1YZ Rotorua	"New Zealand Herald"

14 MATAMATA

A. Crabb, L.I.	Part Matamata
B. A. Gunning, I.A.	
1XH Hamilton	"New Zealand Herald"
1YZ Rotorua	

15 TE AWAMUTU

J. R. Tocker, L.I.	South Waipa
M. G. Boyer, I.A.	Part Otorohanga
1XH Hamilton	"New Zealand Herald"

16 TE KUITI

G. Kent, L.I.	Waitomo
W. L. Osborne, I.A.	Part Otorohanga
1XH Hamilton	"New Zealand Herald"

17 TAUMARUNUI

F. G. Sherwood, L.I.	Taumarunui (now includes
W. V. Brandford, F.I.	Kaitieke and Ohura)
1YA Auckland	"Taranaki Daily News"
	"New Zealand Herald"

18 ROTORUA

A. G. W. Stevens, L.I.	Taupo
C. R. Taylor, I.A.	
1YZ Rotorua	"Rotorua Post"
	"New Zealand Herald"

19 WHAKATANE

E. O. Pedersen, L.I.	Whakatane
S. R. Hewitt, I.A.	
1YZ Rotorua	"New Zealand Herald"

20 OPOTIKI

K. G. B. Wilson, L.I.	Part Opotiki
S. R. Hewitt, I.A.	Mataroa
1YZ Rotorua	"New Zealand Herald"

21 GISBORNE

R. E. Alexander, V.	Cook
E. B. Smythe, L.I.	Uawa
H. de O. Chamberlain, I.A.	Waikohu
R. Whitehead, F.I.	Waiapu
	Matakaoa
2XG Gisborne	"Gisborne Herald"

22 WAIROA

B. L. Grindell, L.I.	Wairoa
E. C. Ayson, I.A.	
2YZ Napier	"Gisborne Herald"
2XG Gisborne	"Daily Telegraph" (Napier)
	"Wairoa Star"

23 HASTINGS

J. J. Byrne, V.	Hawke's Bay
J. G. Niccol, L.I.	Part Waipawa
F. H. Collin, I.A.	Part Patangata
2YZ Napier	"Hawke's Bay Herald-Tribune"
2ZC Hastings	"Daily Telegraph" (Napier)

24 TAIHAPE

A. J. White, L.I.	Rangitikei
A. K. Booth, I.A.	
2XA Wanganui	"Wanganui Chronicle"
2ZA Palmerston North	"Dominion"
2YA Wellington	

25 RAETIHI

A. J. White, L.I.	Waimarino
G. R. Moss, I.A.	Parts Wanganui and Rangitikei
2XA Wanganui	"Wanganui Chronicle"
2YA Wellington	"Taranaki Daily News"

26 STRATFORD

A. R. Murdoch, L.I.	Stratford
S. H. Henry, I.A.	Part Eltham
	Part Inglewood
2XP New Plymouth	"Taranaki Daily News"
	"Taranaki Herald"

FACIAL ECZEMA COMMITTEES . . .

27 NEW PLYMOUTH

J. H. MacDonald, V.	Clifton
R. J. MacIntyre, L.I.	Taranaki
A. C. Burgess, I.A.	Part Inglewood
	Part Egmont
2XP New Plymouth	"Taranaki Daily News"
	"Taranaki Herald"

28 HAWERA

J. N. Spooner, L.I.	Hawera
B. A. J. Smith, F.I.	Waimate West
	Part Eltham
	Part Egmont
	Part Patea
2XA Wanganui	"Taranaki Daily News"
2YA Wellington	"Taranaki Herald"
	"Hawera Star"

29 WANGANUI

S. Jamieson, V.	Waitotara
J. F. Munting, L.I.	Wanganui
A. A. Duncan, I.A.	Part Patea
	Part Rangitikei
2XA Wanganui	"Wanganui Chronicle"
2YA Wellington	"Wanganui Herald"
	"Dominion"

30 FEILDING

H. O. Mackley, L.I.	Kiwitea
C. J. Christie, I.A.	Pohangina
	Part Oroua
	Part Rangitikei
	"Manawatu Evening Standard"
	"Times" (Palmerston North)
2ZA Palmerston North	"Wanganui Chronicle"
2XA Wanganui	"Wanganui Herald"
2YA Wellington	"Dominion

31 DANNEVIRKE

C. R. M. Jones, L.I.	Pahiatua
L. W. Blackmore, I.A.	Woodville
	Akitio
	Dannevirke
	Waipawa
	Waipukurau
	Part Patangata
2YZ Napier	"Daily Telegraph" (Napier)
2ZC Hastings	"Hawke's Bay Herald-Tribune"
2ZA Palmerston North	"Central Hawke's Bay Press" (Waipukurau)
	"Dannevirke Evening News"
	"Times" (Palmerston North)

32 PALMERSTON NORTH

G. T. Williamson, V.	Manawatu
D. R. Thomson, L.I.	Part Horowhenua
J. A. Graham, F.I.	Part Oroua
	Kairanga
2ZA Palmerston North	"Times" (Palmerston North)
2YA Wellington	"Manawatu Evening Standard"
	"Dominion"

33 LEVIN

J. P. MacMillan, V.	Horowhenua (south of Manawatu River)
R. G. Gill, L.I.	Part Hutt
J. M. Hopkins, I.A.	
2ZA Palmerston North	"Chronicle" (Levin)
2YA Wellington	"Dominion"

34 MASTERTON

J. Mullins, V.	Featherston
G. F. L. Hudson, L.I.	Wairarapa South
F. G. Spite, I.A.	Masterton
	Castlepoint
	Mauriceville
	Eketahuna
2YA Wellington	"Wairarapa Times-Age"
	"Dominion"

35 WELLINGTON

P. M. Flodin, V.	Makara
F. P. Doogan, L.I.	Part Hutt
D. I. Glue, I.A.	
2YA Wellington	"Dominion"
	"Evening Post"

B.Agr. Degree to be Introduced

A NEW agricultural degree, Bachelor of Agriculture (B.Agr. and B.Agr. (Hort.)), is to be introduced by the University of New Zealand next year. It will be additional to the existing degrees of B.Agr.Sc., B.Agr.Sc. (Hort.), and B.Agr.Sc. (Dairy Tech.).

The course for the new degree will extend over only 3 years instead of the 4 years necessary for the present agricultural degrees. In future the first year of any of the agricultural degree courses may be taken at either an agricultural college or one of the universities.

Graduates Needed by Department

Graduates from all the agricultural degree courses are required by the Department of Agriculture for its technical staff. Vacancies exist for Instructors in Agriculture, Fields Instructors, Soil Conservators, Research Officers, Farm Management Officers, Machinery Officers, and Drainage Officers.

The Department's aim is to build up its general farm advisory staff with B.Agr.Sc. graduates who in their fourth academic year have specialised in plant or animal production.

Research Officers are employed at the Department's agricultural research stations on experimental work and are mainly drawn from graduates in the M.Agr.Sc. degree, who may also find openings in the farm management and economics section of the Department.

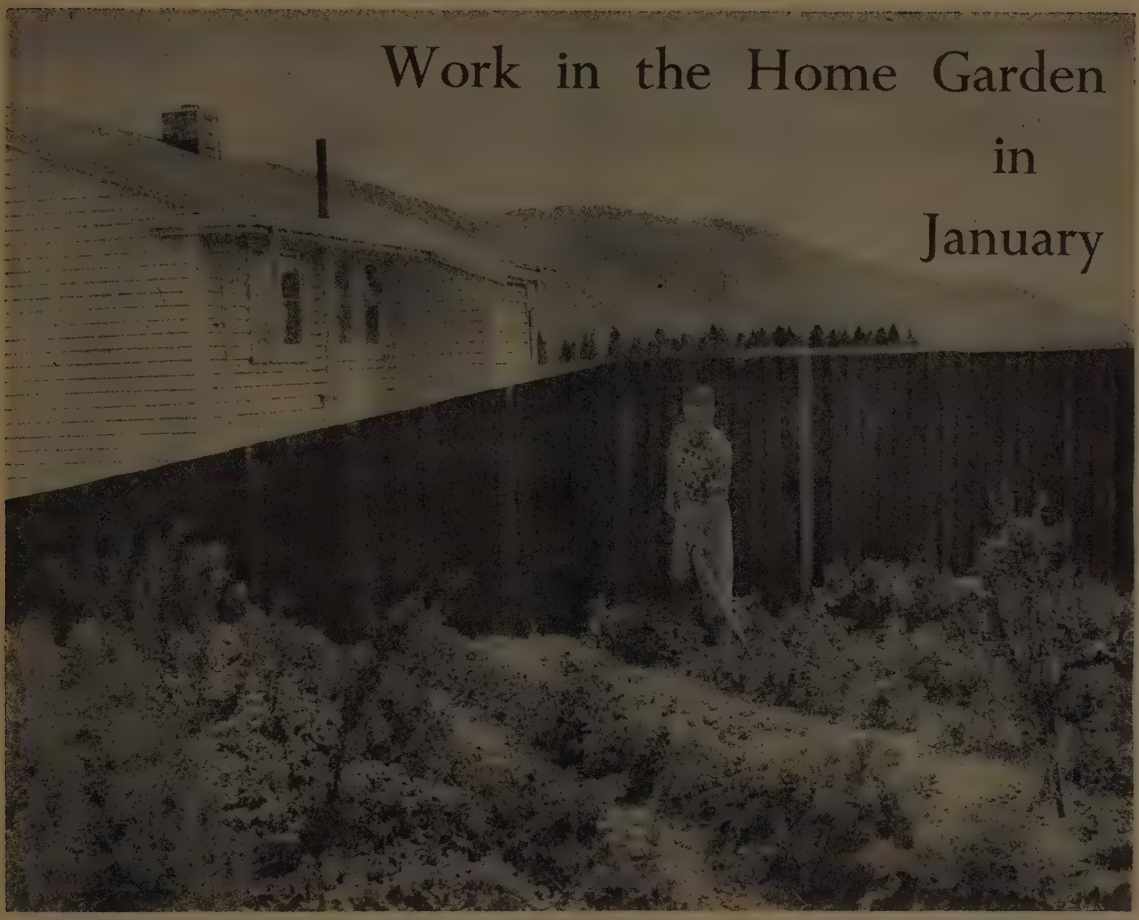
In-service Training

B.Agr. graduates who have special aptitudes or interests for work will be given in-service training by the Department or will take special courses to qualify as special instructors such as Drainage Officers and Machinery Officers.

Students who wish to follow a career in agriculture can obtain information about the opportunities available in the Department of Agriculture by applying to the nearest office of the Department or by writing to the Staff Training Officer, Department of Agriculture, P.O. Box 2298, Wellington.

Copies of the syllabus of the courses for B.Agr. and B.Agr.Sc. degrees are obtainable from the Registrar at either Massey Agricultural College, Massey College Post Office, Palmerston North, or Canterbury Agricultural College, Lincoln College, New Zealand, who will also answer any inquiries about the courses.

Work in the Home Garden in January



By A. G. KENNELLY,
Horticultural Instructor, Department of Agriculture, Dunedin

In January the well-managed garden should yield rich returns in vegetables, which should be available in both quantity and quality. The most urgent jobs in most home gardens during the month include the destruction of weeds and the establishment of vegetables such as savoy or other winter cabbages, broccoli or cauliflowers, leeks, and kale or borecole for late autumn, winter, or spring use. Successional sowing of crops such as lettuce, onions for salad use, radish, and turnips is also important. Where conditions are dry, irrigation and mulching may be needed.

USUALLY the difficulty in the smaller gardens is to find the space to make summer sowings and winter plantings as well, because by Mid-January most home gardens are fully planted with such vegetables as dwarf and climbing beans, carrots, potatoes, shallots, peas, spinach, onions, turnips, lettuces, radishes, and various kinds of beet, all of which are easily grown for harvesting at this time of year. Pumpkins, marrows, cucumbers, tomatoes, and sweet corn should also be ready for harvesting toward the end of the month in most districts.

Continuity of supply should be the aim of every home gardener, and failure to plant winter greens during December or January may in many districts result in a break in supply during winter or early spring.

Where crops such as savoy cabbages, broccoli or winter cauliflowers, curly kale, brussels sprouts, and leeks have not yet been set out the planting of a suitable selection to provide supplies from late autumn until the new season's crops have matured in late spring should, in all except the most favoured districts, be done during the month.

Staked varieties of tomatoes should be pruned regularly and tied up as they develop. In the more humid districts plants should be sprayed with a suitable certified fungicide, combined, where caterpillars are troublesome, with DDT or lindane.

Successional sowings of salad vegetables should be made and celery set out.

Members of the cabbage family, including swedes, turnips, and kohl rabi, should be dusted or sprayed where necessary with an insecticide to give protection against caterpillars or sprayed with nicotine sulphate or lindane to kill aphids. Potatoes should be earthed up and, in the more humid or higher rainfall districts, sprayed regularly with a certified fungicide against late blight.

Ground that will not be required for some time should be sown with a cover crop such as lupins, mustard, barley, or oats. Plant foods are then less likely to be leached out of the soil and its organic content can be built up. The hoe should be kept sharp and used often and vigorously

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in January to remove weeds, which are easily killed in the comparatively dry conditions which are usual then.

Liquid manure can be applied with advantage to most crops in soil lacking plant food and, where necessary, watering or irrigation should be attended to. A satisfactory supply of water is particularly important to the growth and setting of beans; to the growth of lettuce and celery, and to only a slightly less extent to that of other greens.

Celery should be sprayed with captan or bordeaux mixture or a suitable certified substitute, even before leaf spot appears.

Raising Seedlings

Many of the seedling plants sold late in the season by seedsmen are of poor quality, often undersized, and held so long in bundles that the lower leaves have yellowed and many of the fine roots have died. Where a suitable situation and soil are available and the size of the garden warrants it a good plan is to raise seedlings of such plants as lettuce, leeks, cabbage, cauliflower, brussels sprouts and kale by sowing seed of suitable varieties or sowing successionally so that a succession can be assured and the seedlings will have grown to a suitable size when conditions are favourable for planting out.

The plants can be wrenched a little before the expected time of setting out by cutting the outer and the deeper roots with a sharp spade. This is a particularly useful practice if planting must be delayed owing to unfavourable weather or soil conditions or because time cannot be spared for the work of preparing land and planting out.

The usual method is to force a sharp spade at an angle into the soil along both sides of the seedling rows so that the outer and deeper roots are cut. The cuts from each side meet under the plants and sever the ends of the tap roots. This forces the roots to branch, and when seedlings are lifted, usually a week or two later, they have a dense, fine mass of roots, which enables them to be lifted with a good ball of roots and soil and transplanted with little check.

Plants for winter greens, such as kale, cabbages, broccoli, and brussels sprouts, can be grown well only where soil and cultural conditions are good.

Mildew on Peas

Powdery mildew is often serious on pea crops in dry weather. Peas should be grown only where good cultural conditions can be maintained; that is, in moist, well-drained soils of good humus content. Powdery mildew is difficult to control where conditions favour the disease, but dusting with finely ground sulphur or spraying with colloidal sulphur usually gives good results.

Broccoli or winter cauliflower. Plants should be set out in most districts in January.

Mustard Greens

Mustard greens are hardy, useful, and easily grown forms of greens that deserve to be more widely grown in home gardens. Though they are not commonly grown, they are not new. Alternative names for mustard greens are Chinese mustard and mustard spinach, and the improved strains are now available and the modern appreciation of the value of fresh vegetables have made them better known.

There are several kinds of mustard greens — loose-leaved, broad-leaved, and curled types. The variety Tendergreen, which is also known as mustard spinach, is particularly fine. It has dark green, rather thick, fairly smooth, spoon-shaped leaves and combines the flavours of mustard and spinach. As it is slow to seed, its sowing in the hotter, drier districts need not be confined to spring and autumn, as is advisable with some of the other varieties. A hearting variety (Hearting Chinese Mustard) is also sold by some seedsmen. The leaves grow 12in. to 14in. long and the hearts, which are about 6in. to 8in. across, blanch well. The flavour of most varieties is mild.

Though some varieties will grow fairly well in the poorer soils, for best results it is advisable to grow them in rich, moist soils and in moderately cool conditions. The open varieties particularly are an excellent substitute for spinach and should be gathered in the same way, though the leaves are larger than the largest spinach leaves. Thinnings should be pulled first and used with the roots cut off. Later when the remaining plants are large enough a few of the largest leaves can be taken off as they develop. They can be removed with the fingers or scissors and should be used when young and tender; they can be cooked like spinach or used in salads.

Seed should be sown ½in. deep in rows 15in. apart. Seedlings of the open-leaved kind should be thinned to 6in. apart in the rows and of the hearting kind to at least 9in. apart under favourable conditions. The crop should be ready for use in from 35 to 45 days from seed sowing.

Parsnips

Though parsnips are not usually lifted until early winter, it is now rather late for them to be sown in most southern districts. They can still

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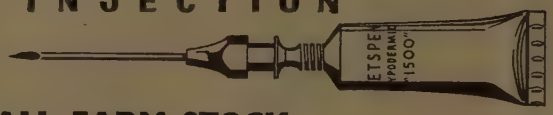

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[*Sparrow*

Harvesting of onions can be started when the bulbs are firm with thin, dead, wiry roots and the tops tend to fall over.

be sown where, as in many northern districts, the autumn is sufficiently long to enable the plants to develop fully before winter stops growth.

Hollow Crown is a popular variety.

Radishes

Small successional sowings of radish should be made as required. Cultural requirements are similar to those of carrots and beet, but as the crop matures much more quickly, it is more sensitive to adverse conditions. The soil should be well drained and the top 6in. cultivated to a very fine tilth. It should be very rich in fine, well-rotted organic matter; well-rotted compost is excellent.

Seeds should be sown thinly (12 to 15 per foot of row) ½in. deep in rows which need be only 4in. to 6in. apart. The soil should be gently firmed after sowing, as the roots do not bulb well in loose soil. Seed can also be sown broadcast, but weeding is then more difficult.

The roots should never dry out and in mid-summer shelter from the sun is advisable. This is best achieved by sowing in the shade of a taller crop.

The value of radishes lies in their fresh crispness and mild pungency. Pungency and fibre are, however, so greatly increased by slow growth or checks that in adverse conditions radishes are likely to be hot, pithy, and indigestible.

Radishes can be sown at any time of the year in well-drained soil, provided there is sufficient moisture and soil temperature is high enough.

Salad Vegetables

Largely because they are eaten raw, salad vegetables are almost without exception a useful source of vitamins. In the well-planned garden an adequate supply should be available each year for as long as the weather permits. Plants used in salads include beetroot, celery, chicory, chives, cress, cucumbers, endive, lettuces, mustard, nasturtium, onions, shallots, and tomatoes.

Lettuces, Radishes, Spring Onions

If ground conditions are favourable, small successional sowings of lettuces, radishes, and spring onions may be made. These vegetables remain in the best condition for only a limited time and should be used when young and fresh.

A well-drained, deeply cultivated soil rich in humus is necessary, as quick, vigorous growth is essential for crisp, succulent produce. The soil for lettuce particularly should be in good condition and adequately supplied with nitrogenous matter.

Shallots

The harvesting of shallots can be begun as soon as the bulbs are mature and the roots have started to rot. Proper drying off of the bulbs is important and if the weather is unfavourable, they should be laid under cover in trays in a dry shed.

Swede Turnips

In growing conditions that suit them swede turnips mature in from 55 to 90 days, but growth and yield are greatly influenced by climate. Varieties that require a long growing season thrive best in a cool, moist climate with neither dry periods nor very heavy rain. Sunshine is not important; in fact, because of the moister conditions longer-maturing varieties generally do best in late autumn, when sunshine is reduced.

Good swedes are a very useful addition to the home garden, particularly in the far south, where conditions enhance their quality and flavour. Swedes are high yielding and, like turnips, do not require special soil, provided drainage is good and there is adequate moisture. They respond well to a soil moderately rich in well-rotted organic matter. A dressing of superphosphate at 1oz. to 2oz. a square yard is advantageous on many soils.

In the home garden swedes are usually grown for late autumn and winter use. In southern districts a sowing can be made in November or December; further north December or

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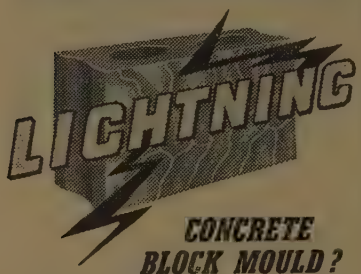

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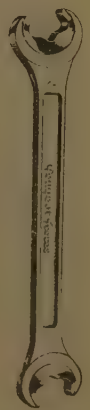

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January is favoured. In very mild districts even February is not too late. Suitable varieties can be sown earlier where there is sufficient moisture for growth. However, as there is rarely much demand for swedes until late autumn, and cool conditions are required for producing the best roots, it is usually advisable to delay sowing, provided the roots are able to make most of their growth before winter.

In some districts swedes are affected by an internal breakdown known as brown heart. It can be detected first when the plant is about 2in. in diameter. If the root is cut deeply so that a right-angle piece is removed, a clearly defined zone will be seen near the centre with areas mottled greyish, brownish, and glassy, usually concentrically or radially. Leaves may be curled and brittle and the bulbs woody with a bitter taste.

Brown heart is caused by a deficiency of the element boron. It can be overcome by the application of ordinary borax, though in the home garden liberal dressings of organic manure will usually correct the deficiency. The ground should not be limed when this trouble occurs.

Good varieties of swedes for the home garden include Laing's Garden and Superlative Table.

Tomato Troubles

Few crops are subject to as many diseases as the tomato, and plants should be watched for virus disease. Plants that show any symptoms of virus infection, for which there is no cure, should be destroyed at once. Distortion of the young leaves or mosaic mottling may indicate infection with this type of disease, different types and combinations of which vary in their effect on plants.

Marrows, like other members of the cucurbit family, do best in good soil in a warm, sunny situation.

Plants which develop narrow, often distorted, fern-like leaves or have a stunted appearance usually produce little if any crop and should be removed and burnt. Those infested with spotted wilt, recognisable in the early stages by a bronzing (often very fine) of the foliage with a pattern of brown spots toward the base of the top leaflets and usually later by a stunted appearance and a rolling and bunching of the top leaves, should also be burnt. Spotted wilt is one of the most serious diseases with which the tomato grower has to contend. It is commonly spread from diseased to healthy plants by thrips, which are minute, dark, cigar-shaped insects with fine, hair-like, or brush-like wings; the grubs are usually yellowish green.

Many garden plants such as Iceland poppy, chrysanthemum, lettuce, nasturtium, aster, dahlia, and zinnia are subject to spotted wilt and also serve to carry over the disease from season to season. Thrips are sometimes difficult to control, as they have such a wide range of host plants and in the warm, sheltered conditions which suit tomatoes they are prolific breeders.

Regular spraying with DDT is usually effective against thrips, as it is against stem-borer caterpillar and looper caterpillar, two other common pests of tomatoes.

Where potato blight is troublesome bordeaux mixture or a suitable Government-certified substitute should also be applied regularly to tomatoes. The first spray should be applied about 7 to 10 days after planting out, and thereafter spraying should be repeated every 2 to 4 weeks according to the weather and the extent to which the disease is troublesome.

Parsley seed is often slow to germinate, but a sowing made in moist soil in January should provide supplies throughout next winter and spring.

Cooling of Milk and Cream and Chilling of Town Milk

By M. J. McFETRIDGE,
Supervisor of Farm Dairy Instruction, Department of Agriculture, Hamilton

EFFICIENT cooling of milk or cream is essential for the production of a good product, irrespective of whether it is for manufacturing or town supply milk. Such cooling is a necessary preliminary in securing best results from subsequent chilling of town milk. The principal advantage of efficient cooling is that development of bacteria is retarded or stopped at low temperatures. Consequently milk and cream produced under good conditions and efficiently cooled will maintain its quality for a much greater period than will uncooled milk or cream, which will begin to deteriorate immediately after production. Cooling will also assist in reducing the incidence of churned cream.

TO obtain efficient cooling of milk or cream it is necessary to have a good supply of cold water at the dairy. The source of supply should be as close as possible to the dairy and there should be sufficient water available to give a ratio of 3 parts of cooling water to 1 part of milk being cooled. An efficient cooler operated within its rated capacity will cool milk to within 3 degrees F. of the temperature of the water at the inlet of the cooler.

Several makes of cooler now available will easily do this, but often good equipment fails because of faulty installation. Points which should be watched by the farmer are:—

1 The water supply to the cooler must be both adequate and cold enough.

2 The quality of the cooling water should be considered. If it has a high mineral content, a coating will form on the inside of the tubes, acting as an insulator and making the cooler ineffective. Cooler tubes should be cleaned internally from time to time if the water has a high mineral content.

3 Restrictions at the cooler outlet caused by faulty or makeshift piping are quite common. Care should be taken to see that both outlet and inlet piping are of correct size and have no restrictions. If the outflow water is used for udder washing, it should be taken off through a bypass to prevent any back pressure, which would restrict the flow of water through the cooler tubes.

4 Some means of controlling the rate of milk flow over the cooler is essential if maximum efficiency is to be obtained. The rate of milk flow over the cooler should not be greater than the manufacturer's rating and the most satisfactory way of regulating the flow is by a control vat. Vats are available in sizes to suit individual requirements, and the size of the milking machine, breed of cow, and type of milking shed should all be taken into account before a vat is installed.

Variations in Milk Flow

The following are typical figures of the variations in milk flow during one milking where no control vat was installed. The figures were obtained from dairies taken at random during a special investigation made by officers of the Dairy Division.

Size of machine and breed of cows	No. of milkers	Rate of flow of milk over cooler Max. gals. per hour	Min. gals. per hour
Jersey:			
3 single ..	2	64	30
3 double ..	1	122	27
3 double ..	1	53	21
4 double ..	2	60	30
8 single ..	2	144	76
8 single ..	3	211	25
Friesian:			
4 single ..	2	63	27
4 single ..	2	40	28
4 double ..	2	109	49
6 single ..	2	108	43
6 double ..	3	192	44
6 double ..	2	200	30

These figures show that proper control of milk flow is essential. The installation of a control vat at one of the above dairies gave an improvement of 6 degrees F. in the over-all temperature of the milk produced.

Heavy milking breeds usually have a faster milking rate than light breeds. Elevated-bail milking sheds usually give a faster rate of milking than do orthodox sheds, and in herringbone sheds there are wide variations in the quantity of milk being discharged from the releaser.

Increase in the number of teat-cups, for instance by doubling up the plant, will also increase the volume of milk delivered from the releaser and inevitably will extend the time (if cooling is to be done effectively) to well beyond the actual milking time.

Chilling of Town Supply Milk

Milk chilling equipment is being installed in many town supply dairies and this is being encouraged by the Dairy Division of the Department of Agriculture as being an important factor in the provision of a better product to consumers of milk. Farmers contemplating installing chilling plant should not overlook the possibility of increases in the numbers of their herds becoming possible by better management and improved pastures enabling increased carrying capacity, or by doubling up of their machines enabling more cows to be handled. They should plan the installation of chilling plant adequate for their foreseeable production; otherwise they might be faced with repetition of the expense of installation or with reduced efficiency because of inadequate plant.

Factors affecting the efficiency are:—

1 Proper control of milk flow over the cooler to ensure that it does not exceed the rated capacity of the unit.

2 Efficient primary cooling by having an adequate supply of cold water to cool the milk to as low a temperature as possible on the water-cooling section.

The chilling installation should be in a well-ventilated position to obtain maximum efficiency from the compressor. Coolers should be installed in the dairy or on the milk stand and should be easily accessible for cleaning.

Cool rooms or cabinets should be close to the water cooler with easy access for placing the can in the room and for loading out. Two types of chilling unit, known as ice bank and direct expansion, are in general use. Either is suitable and will be satisfactory if it is installed and operated correctly. Important factors are:—

1 Efficient primary cooling by the water cooler (as discussed earlier in this article). This is important, as the more effective this cooling is the more efficiently will the chilling unit function.

2 The quantity of milk to be chilled during the peak months of the producing season. Allowance should be made for maximum quantities, as an under-estimation would result in the unit being incapable of chilling the milk to 40 degrees F. at the time when it is most needed, particularly if an ice bank system is installed.

Purpose of Chilling

The purpose of chilling milk is to maintain the quality of the milk as it leaves the cow. Chilling should never be regarded as a means of offsetting bacterial growth resulting from an unsatisfactory standard of cleanliness. Practically all types of bacteria are most productive at the temperature of uncooled milk, or at the temperature it is received from the cows. Other bacteria still thrive at low temperatures. Chilling must therefore be regarded as but one of the safeguards of quality.

1957 Pig Carcass Competitions

Emphasis on Profitability in Pig Production

SOME outstandingly high-quality teams were again exhibited in the North Island Porker and Baconer Carcass Competitions in 1957. The number of entries was somewhat lower, in keeping with reduced killings, but over-all quality was well maintained and the entries from the Wellington Province were markedly improved. In this review by A. Longwill, Superintendent, Pig Industry, Department of Agriculture, Wellington, it is emphasised that those who have continued to interest themselves in the growth-rate section of the competitions are, on the whole, demonstrating a high level of efficiency of production.

REDUCED entries but a high level of quality in the prizewinning pigs, an increased proportion of those entering in the growth-rate section who were able to achieve the qualifying standards, and some particularly good performances of teams from the pumice country were features of the 1957 series of pig carcass competitions sponsored by Messrs. W. & R. Fletcher (N.Z.) Ltd.

The entries comprised groups of 4 pigs, each carcass being individually appraised and team points allotted on the following scale:—

TABLE 1—POINTS SYSTEM USED IN COMPETITIONS

	Maximum points Porkers	Baconers
Measurement		
Body length	20	20
Backfat: Shoulder ..	10	10
Loin	15	20
Balance of side ..	5	5
Eye appraisal		
Hams	15	15
Shoulders	10	10
Development of loin ..	10	10
Belly thickness ..	5	5
Marketing points ..	10	5
Total carcass points ..	100	100
Team points		
Evenness of weight ..	10	10
Conformation	10	10
Total carcass points (4 carcasses)	400	400
Carcass quality max. per team	420	420
Growth-rate points per team	100	100
Max. points for growth-rate section	520	520

Excellent Quality

The leading teams in the competitions were again of excellent quality with the champion baconer team from Messrs. Hooper Bros., Gisborne, scoring a record 369 for carcass. The best porker teams were not quite up to the exceptional standard of last year's champion team. Trends over recent years as evidenced by the points scored by the best team in each section are shown in Table 2.

[*Sparrow*

Mr. R. J. Harper with his team of Large White porkers which won the grand championship for porker teams with 360 points. Mr. Harper farms at Broadlands and this is the first occasion on which a champion team has come from the central North Island pumice area.

TABLE 2—POINTS SCORED BY BEST TEAMS

	Carcass-quality only			Growth-rate section	
	Porkers	Baconers	Combined	Porkers	Baconers
1951 ..	342	347	680	409	405
1952 ..	343	348	678	441	429
1953 ..	350	349	674	447	398
1954 ..	353	353	686	433	442
1955 ..	352	367	696	443	463
1956 ..	373	361	730	463	454
1957 ..	360	369	711	453	452

It is evident that further progress is likely to be slow and will probably depend on the market offering more incentive to the production of quality carcasses.

Profitable Production

Until this happens it will certainly be more profitable to the individual producer to concentrate his selection of breeding stock more on the farm performance characteristics of prolificacy and litter production, growth-rate, and efficiency of conversion of feed to meat.

It is significant that a higher proportion than ever of the teams entered in the growth-rate section achieved the high standard required for publication. Table 3 sets out the number of teams in each category of the growth-rate section and the percentage in each case which has qualified for publication of results which are given in Table 4.

TABLE 3—ANALYSIS OF RESULTS IN GROWTH-RATE SECTION

	Porkers	Baconers	Total
No. of teams entered	58	25	83
No. of teams reaching merit standard	41	14	55
Percentage of teams in section reaching this standard	71	56	66

Particulars of the breeding, date of birth, age and weight at slaughter, carcass points, total points, and percentage of possible points are given in Table 4 for the 41 porker and 14 baconer teams which qualified.

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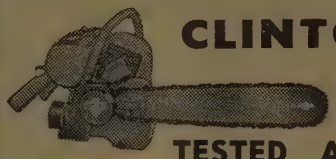

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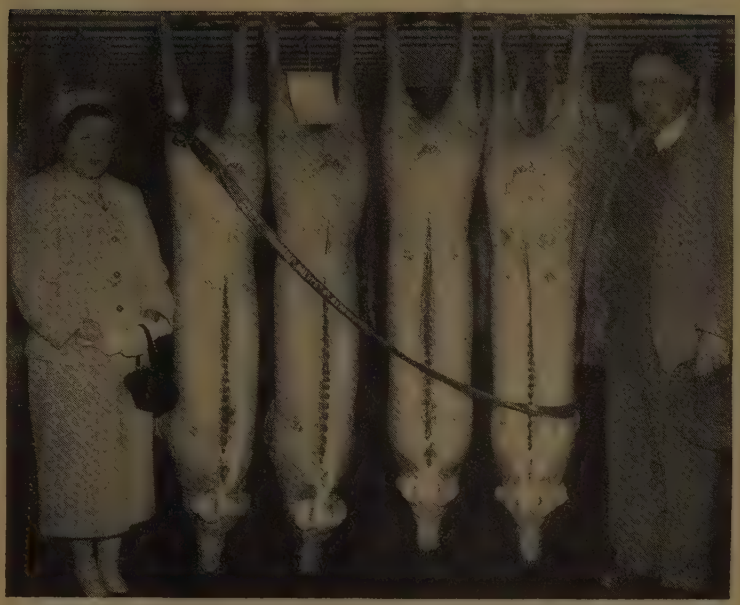
Efficient Use of Food

The results included in Table 4 contain a great deal of food for thought when the profitability of production of different teams comes under consideration. Leaving out any complications that would be introduced by different levels of meal feeding, which would not be appreciable after the weaning stage in any case, the difference in profitability can be estimated from an examination of the food required to grow pigs of average efficiency at the different rates involved. Table 5 sets out in detail the amount of food used by a pig growing at the standard rate laid down (left half of table) and by the slowest-grown teams included in Table 4.

The slow-growth schedule given in the table is based on the slowest-growing porker team included in Table 4 (but not the slowest-grown entry) up to 116lb. liveweight and continued from this stage at a slower rate to reach 200lb. at 40 weeks of age, which was the performance of the slowest-grown baconer team in Table 4. This is the type of growth pattern which would be likely to promote the best possible carcass in a pig of this age, as it would result in reasonably good lean-meat development up to porker weight and avoid overfattening in the later stages of growth. However, restricting growth to the rate shown clearly results in unprofitable use of food.

To reach 76lb. porker weight from the 40lb. liveweight weaner stage the normal pig uses 196 food units; the slow-grown pig requires 269 food units from 30lb. liveweight to the same pork weight. On this basis of food use the amount and value of pigmeat which would be produced on a given amount of food and under the same housing conditions would be about:—



[*Sparrow*

Mr. and Mrs. S. J. Hooper with the baconer team entered by Hooper Bros., Muriwai, Gisborne, which had a record carcass score of 369.

	£	s.	d.
Normal litter of 8 pigs: 600lb. of pork @ 1s. 9d. ..	52	10	0
Slow litter of 8 pigs: 436lb. of pork @ 1s. 9d. ..	38	3	0
Loss on slow growth ..	14	7	0

TABLE 4—TEAMS GAINING 70 PER CENT. OR MORE OF TOTAL POINTS IN GROWTH-RATE SECTION

The details below are given in the following order: Exhibitor; breeding of pigs; age (in days) at slaughter; average deadweight (in pounds) of 4 pigs; carcass points; total points; total points as percentage of possible points (520).

PORKERS

Mrs. A. E. Wood, Whakatane; L.W.; 2/1/57; 111; 72; 354; 453; 87
A. P. Roe, Mamaku; B. x L.W.; 10/1/57; 111; 74; 340; 440; 84
N. H. Ford, Rotorua; L.W.; 6/12/56; 110; 74; 330; 430; 83
*L. F. Eustace, Hawera; L.W. x (L.W. x B.); 3/12/56; 120; 74; 359; 428; 82
R. J. Bent, Otorohanga; L.W. x B.; 23/12/56; 114; 74; 321; 421; 81
H. E. Johnson & Co., Whangarei; L.W.; 26/1/57; 116; 75; 327; 420; 81
A. D. Aiken, Waverley; L.W. x B.; 13/2/57; 119; 76; 320; 420; 81
W. G. Bell, Ardmore; L.W.; 26/12/56; 133; 78; 347; 418½; 80
I. Billington, Eketahuna; L.W.; 2/12/56; 123; 93; 318; 418; 80
N. J. Alexander, Nuhaka; T. x B.; 15/2/57; 117; 76; 324; 417; 80
N. J. Alexander, Nuhaka; T. x B.; 25/11/56; 122; 77; 324; 416; 80
H. J. Billington, Eketahuna; L.W.; 1/12/56; 124; 87; 315; 415; 80
T. H. Jackson, Inglewood; L.W. x B.; 20/12/56; 118; 84; 315; 415; 80
*R. A. Julian, Kakaramea; L.W.; 8/10/56; 137; 88; 322; 412; 79
A. D. Aiken, Waverley; L.W. x B.; 7/2/57; 118; 74; 321; 411; 79
A. E. Wood, Whakatane; L.W.; 15/11/56; 131; 75; 345; 410½; 79
A. E. Wood, Whakatane; L.W.; 6/12/56; 130; 75; 341; 408½; 79
K. W. Jackson, Inglewood; L.W. x B.; 6/12/56; 118; 87; 307; 407; 78
H. H. Ford, Rotorua; L.W.; 6/12/56; 110; 76; 307; 406½; 78
W. G. Bell, Ardmore; L.W.; 26/12/56; 133; 71; 356; 406½; 78
J. G. Black, Whakatane; L.W. x B.; 1/1/57; 133; 77; 336; 405; 78
R. G. Underwood, Puahue; L.W. x (L.W. x B.); 24/12/56; 109; 64; 316; 405; 78
A. P. Roe, Mamaku; B. x L.W.; 9/1/57; 112; 73; 305; 404½; 78
P. Darby, Bombay; L.W. x B.; 25/11/56; 131; 74; 340; 403; 78
J. Tedd, Cambridge; L.W. x B.; 17/10/56; 124; 84; 304; 401½; 77
V. D. Griffin, Hexton; L.W. x (L.W. x B.); 27/10/56; 109; 93; 300; 400; 77
Hastie Bros., Te Puke; L.W. x B.; 22/10/56; 133; 75; 334; 396½; 76
D. W. McIntosh, Pokeno; L.W.; 23/10/56; 134; 77; 328; 394; 76
*J. W. Latham, Stratford; T. x B.; 18/12/56; 100; 73; 294; 394; 76
V. D. Griffin, Hexton; L.W. x (L.W. x B.); 27/10/56; 109; 95; 290; 390; 75
Mrs. N. K. Topp, Ormond; L.W. x B.; 13/11/56; 148; 81; 340; 387; 74
I. Billington, Eketahuna; L.W.; 20/1/57; 116; 98; 285; 385; 74
D. W. McIntosh, Pokeno; L.W.; 23/10/56; 155; 86; 340; 384; 74
H. J. Billington, Eketahuna; L.W.; 27/12/56; 126; 94; 282; 382; 73
Hastie Bros., Te Puke; L.W. x B.; 22/10/56; 142; 74; 340; 380½; 73
H. A. and A. D. Aiken, Waverley; L.W. x B.; 19/1/57; 122; 70; 308; 380; 73
R. J. Bent, Otorohanga; L.W. x B.; 12/12/56; 112; 74; 280; 377; 73
Fowell Bros., Howick; L.W. x B.; 8/1/57; 148; 76; 341; 372; 72
P. Darby, Bombay; L.W. x B.; 8/10/56; 142; 72; 335; 370; 72
Fowell Bros., Howick; L.W. x B.; 8/1/57; 151; 77; 339; 368½; 71
B. R. Green, Turua; T. x B.; 11/10/56; 146; 105; 268; 364; 70

BACONERS

H. E. Johnson and Co., Whangarei; L.W.; 28/11/56; 175; 148; 352; 452; 87
Mrs. S. E. Edwards, Dannevirke; L.W. x L.B.; 30/6/56; 193; 152; 333; 433; 83
H. A. and D. A. Aiken, Waverley; L.W. x B.; 20/8/56; 171; 148; 319; 419; 81
*L. F. Eustace, Hawera; L.W. x; 3/12/56; 190; 135; 332; 409; 79
I. Billington, Eketahuna; L.W.; 16/8/56; 175; 137; 309; 408; 78
N. J. Alexander, Nuhaka; T. x B.; 7/9/56; 201; 146; 325; 406; 78
H. A. and D. A. Aiken, Waverley; L.W. x B.; 10/8/56; 181; 139; 308; 405; 78
W. G. Bell, Ardmore; L.W.; 29/8/56; 210; 139; 349; 404; 78
K. Edwards, Dannevirke; L.W. x B.; 28/8/56; 172; 150; 301; 401; 77
A. D. Aiken, Waverley; L.W. x B.; 1/8/56; 183; 149; 299; 399; 77
I. Billington, Eketahuna; L.W.; 16/8/56; 175; 145; 295; 395; 76
G. Edwards, Dannevirke; L.W. x L.B.; 30/6/56; 187; 157; 284; 384; 74
Fowell Bros., Howick; L.W.; 1/7/56; 213; 145; 315; 375; 72
Hooper Bros., Muriwai; L.W. x T.; 22/8/56; 280; 143; 369; 369; 71

* Whey feeder.

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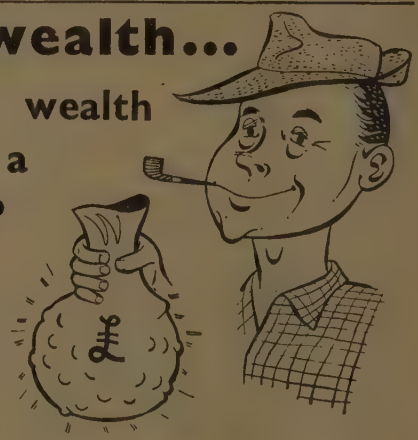

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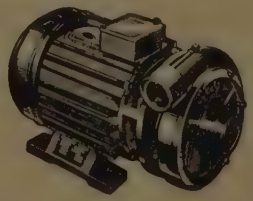

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When the extra labour and overheads associated with slow growth are taken into consideration the true loss with the slow litter compared with the normal would be about £2 per pig.

For the very slowly grown baconer team taken as an example the uneconomic use of food is even more serious. At slaughter this team was 3 months older than standard. On a given food supply which would produce 1000lb. of pigmeat from a litter on the normal growth-rate a litter grown at the slow rate would produce only 645lb. This arises from the fact that as the animal grows the food required merely for maintenance of body-weight, exercise, and vital functions increases. If weight gains are small, the food cost of these gains is large, because the maintenance requirements of the pig loom too large in the total feed intake.

At the other extreme too-rapid fattening is undesirable because it results in the production of too much fat in proportion to lean in the carcass. The advantage of profitable conversion of food to meat in the more rapid growth, at least up to the level of the standard growth-rate, will be seen from the following calculation:—

	£	s.	d.
1000lb. of pigmeat @ 1s. 8d.	83	6	8
645lb. of pigmeat @ 1s. 8d.	53	15	0
Loss on slow growth ..	29	11	8

Under faster than normal growth it is possible that 100lb. extra carcass weight could be produced from the same food supply. The value of this, if all prime grade, would be £8 6s. 8d. If, however, in achieving this rapid growth all the pigs of the litter were graded down, with a penalty of 2d. per pound, the advantage would be wiped out. However, a good type of baconer pig should be able to achieve normal growth-rate without becoming overfat.

From what has been said in this section it is clear that the failure of the trade generally to find a method of paying premiums for quality leaves the logical, businesslike farmer no option but to concentrate on selecting and managing his pigs to secure more rapid growth-rate and to place carcass quality on a much lower level of priority. Under such market conditions carcass competitions which do not take farm profitability into account have little value in encouraging improvement in farming efficiency. For this reason the competitions under review are valuable, as the information obtained from the growth-rate section entries proves that efficient feed conversion and carcass quality (which together make up efficiency in pig production) can be combined by good commercial management.

TABLE 6—CARCASS QUALITY POINTS ONLY. TEAMS SCORING 80 PER CENT. OR MORE OF POSSIBLE POINTS AND COMBINED TEAMS SCORING 75 PER CENT. OR MORE OF AGGREGATE POINTS

The details below are given in the following order: Exhibitor; breeding of pigs; points (possible: baconers and porkers 420 each, combined 840).

BACONERS

W. G. Bell, Ardmore; L.W.; 355
B. Bolstad, Pahiatua; L.W.; 354
E. Russell, Waiuku; L.W.; 351
R. K. Robb, Woodville; B. x L.W.; 343
Cook Hospital, Gisborne; L.W. x; 340
Mrs. B. Bolstad, Pahiatua; L.W.; 336

PORKERS

L. M. and R. J. Harper, Reporoa, L.W.; 360
W. D. Hope, Te Puke; B.; 350
R. J. Mountford; L.W.; 348
Mrs. N. K. Topp, Gisborne; L.W. x B.; 340
Hooper Bros., Gisborne; L.W. x T.; 336

COMBINED

W. G. Bell, Ardmore; L.W.; 711
Hooper Bros., Gisborne; L.W. x T.; 705
*L. F. Eustace, Hawera; L.W. x; 691
H. E. Johnson and Co., Whangarei; L.W.; 679
B. Bolstad, Pahiatua; L.W.; 670
*R. A. Julian, Kakaramea; L.W.; 640

* Whey feeder.

[R. W. Orr

Taking the measurement of body length (anterior edge of symphysis pubis to anterior edge of first rib at its junction with the sternum) with calipers which have been specially designed to do this and to measure exterior chest depth.

TABLE 5—FOOD REQUIREMENTS OF PIGS OF AVERAGE GROWTH ABILITY FED ON A NORMAL AND A LOW PLANE OF NUTRITION

	40lb. Weaner				30lb. Weaner			
Age	Live-weight	Equivalent dead-weight	Average liveweight gain lb./day	Food units for period	Live-weight	Equivalent dead-weight	Average liveweight gain lb./day	Food units for period
weeks								
10 ..	55		1.1	30	40		0.71	23
12 ..	71		1.1	40	51		0.79	25
14 ..	88	58	1.2	48	63		0.86	35
16 ..	106	71	1.3	56	76		0.93	42
18 ..	124	85	1.3	62	89	59	0.93	48
20 ..	143	100	1.4	68	102	68	0.93	52
22 ..	162	115	1.4	73	116	79	1.0	55
24 ..	181	130	1.4	77	128	88	0.86	57
26 ..	200	145	1.4	82	140	97	0.86	59
28 ..					150	105	0.71	60
30 ..					158	111	0.60	60
32 ..					166	118	0.60	61
34 ..					175	125	0.60	62
36 ..					184	132	0.60	63
38 ..					192	139	0.60	64
40 ..					200	145	0.60	65
Total food units				536				831

Weight Suitability

It has been pointed out in previous reviews of carcass competitions that throughout the baconer weight range there is a tendency for carcasses as they increase in weight to become overfat. Conversely the lighter carcasses tend to score better on length. Optimum weights ranged from 136lb. to 150lb. in the competition under review, but for the coming year this has been revised to 126lb. to 150lb. in sympathy with the preference expressed in commercial price schedules for lightweight baconers. The author considers the change undesirable for the following reasons:—

1. There is some evidence from a small-scale consumer-preference survey that, offered the choice of the same proportion of lean to fat in rashers from heavy (150lb.) and light (138lb.) baconer carcasses, the majority of consumers preferred rashers from the heavier side.

2. Curing costs per pound are higher on the lighter sides.

3. Encouragement given to the production of the lighter carcass, both by the present commercial schedules and the lowering of the optimum weight range for competition points, will undermine breeders' and industry leaders' efforts to produce better bacon-type pigs.

Carcass Only Results

Table 6 contains particulars of teams which achieved a score of 80 per cent. of the possible points for carcass, but on which it is not possible to make any comments regarding the merit of the performance because no information is available on farm performance and there is therefore no knowledge of whether or not pigs were profitable to the producer.

An Electric Fence For Sheep

By W. T. STEER,
Farm Manager,
Department of Agriculture Irrigation
Research Station, Winchmore

A SHEEP-PROOF electric fence for break grazing can be made from square-mesh netting and wooden battens. Such a fence has given satisfactory service for some years at the Department of Agriculture's Irrigation Research Station at Winchmore, Canterbury.

FOR the wintering of sheep in Canterbury autumn-saved grass is gradually becoming more popular, particularly on the irrigated areas, where the production of such grass is assured even if a dry autumn is experienced. At the Research Station it is the policy now to winter about 1000 experimental ewes and some 300 to 400 dry sheep on autumn-saved grass plus hay.

Autumn-saved grass is a valuable feed and wastage should be reduced to a minimum; for its efficient utilisation break feeding is almost essential. This involves either the erection of the standard square-mesh netting fence stapled to stakes or the use of some form of electric fence.

Ewes break feeding autumn-saved grass. The fence is shown attached to a batten, with the electric unit coupled to the top wire.

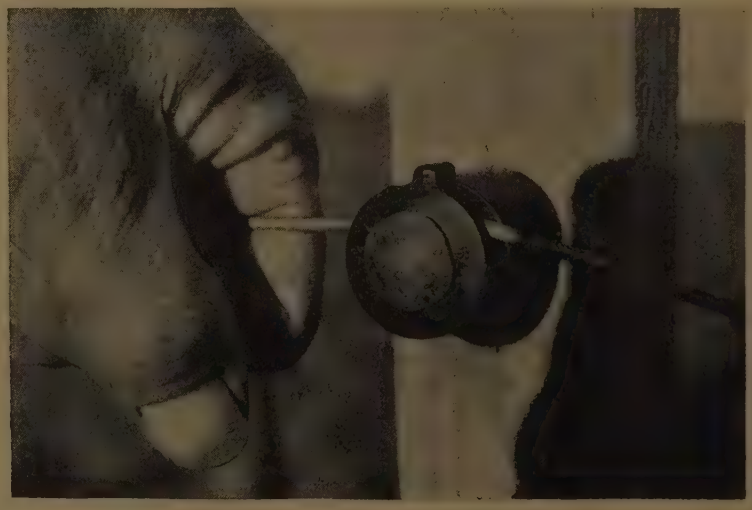
Ordinary square-mesh netting has 7 horizontal strands and is approximately 3ft. wide. For the construction of an electric fence such as that at Winchmore the netting is cut in half longitudinally, giving one half about 14in. wide with 4 horizontal wires and the other half of approximately the same width with 3 horizontal strands. Each half makes a very suitable fence.

For uprights wooden battens 2in. by 1in. by 2ft. 6in. are used. Bolted to each batten is an iron point with foot attached for ease of forcing the batten into the ground. Also bolted to each batten are two plastic circular insulators spaced 1in. to 2in. wider apart than the width of the netting used. This gives just sufficient tightness to the wires to hold them in position on the insulators. It is satisfactory to bolt the bottom insulator 10in. from the bottom of the batten.

To erect the fence the battens are spaced about ½ chain apart and the netting is rolled out and strained and then clipped to the insulators. To take down a fence 7 to 8 chains long and re-erect it for a fresh break takes one man about 30 minutes.

▼ Type of foot attached to batten.

▼ Placing the top wire on to the insulator.



Placing of Supers and Harvesting of Honey

Seasonal Notes for the Domestic Beekeeper

BEE colonies that have been given care during spring such as requeening and comb arrangement and that are housed in good weather-proof hives will need very little attention during the honey flow, with the exception of the placing and removing of honey supers, advice on which is given in this article by A. W. Bennett, Apiary Instructor, Department of Agriculture, Hamilton. The correct setting up of honey extracting equipment and the packing and storing of honey are also briefly discussed.

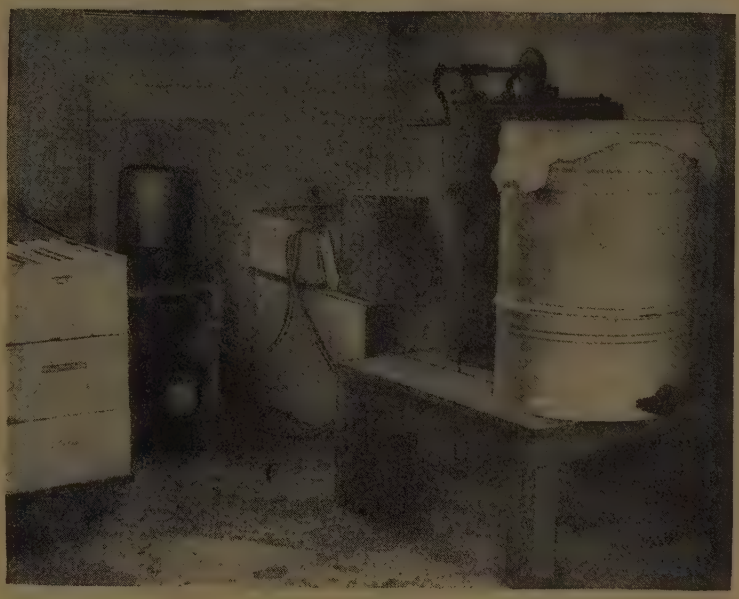
A BEEKEEPER'S knowledge of the strength of his hives, of the condition of pastures, and of the likely periods of the main nectar flows will help him considerably in judging when the hives are likely to require supers. Of course, the weather conditions can very quickly upset the best-organised routine. Successful beekeepers who have kept bees over a number of years take great interest in their local conditions, and by so doing have their hives supered at just the right time to take advantage of the complete flow.

Time to Place Supers

Should the hive consist of two brood boxes for the queen to work in and both boxes are full with bees, it can be taken for granted that as soon as fresh white wax trimmings are showing on the face of the combs along the top bars of the top box the time is right for the first honey super to be put on. The second super should be added later, as soon as the first shows signs of the honey being capped over.

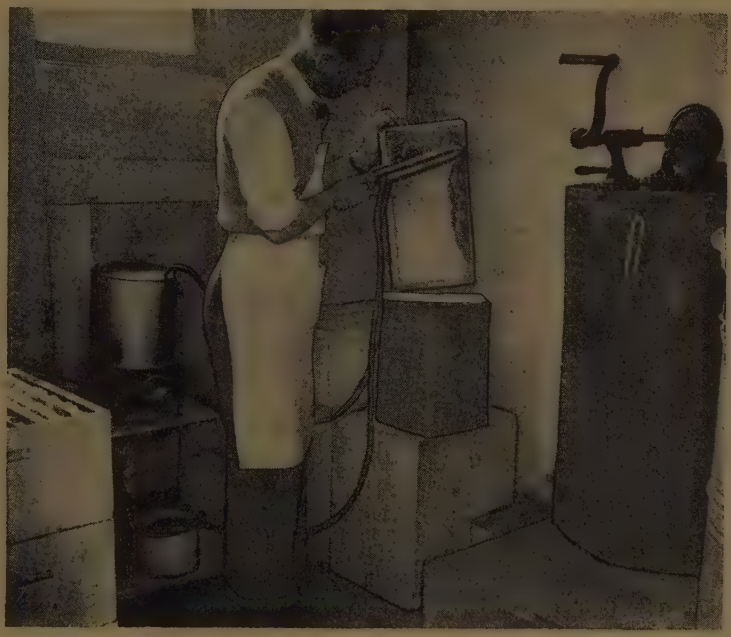
When an excluder is being used on the hive it is far better to add the second super below the first one, as bees have a tendency to move unsealed honey up, if there is room, but if no excluder is used, the second super should be placed above the first. The first super containing stored honey will act as an excluder, as most queens are very reluctant to travel upward over a large area of honey. The queen will thus be confined to the two lower brood boxes.

The beekeeper who is able to add his honey supers one at a time as required by the bees will find this practice will pay, because the bees will not be so disheartened as when two or more boxes of empty combs are added at the same time, a practice requiring a large amount of energy from the bees to generate enough heat to get the added combs soft and usable. Where too much room is provided the generating of heat by the bees not



Equipment set up ready for extracting in the corner of a shed.

Uncapping into a 60lb. tin, using a steam knife.



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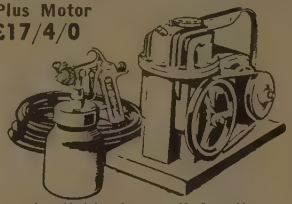

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only uses up a large amount of stores but often delays a large number of bees from gathering honey for several days. The beekeeper with very little spare time who wishes to add his honey supers all at once should stand them out in the sun to warm before putting them on his hives. This will save the bees much work and induce them to take much more readily to the supers. This warming of supers of combs in the sun is also an advantage to the person who adds one super at a time.

Queen Excluders

There are several patterns of queen excluders any of which can be of great help to the beekeeper and which should be used by all beekeepers who have only limited time to attend to their bees. Their proper use, to exclude the queen from the honey supers and confine her to the brood boxes of the hive, helps to simplify the work of the beekeeper and to increase production.

Where a queen excluder is not used the queen and bees may work up from the bottom box, with the result that it is left empty, and in this state the combs would quickly deteriorate. Also, in hives worked without queen excluders much more time is required for the adjustment of brood combs to their normal position in the two lower boxes. It is not good beekeeping to allow the bottom box of combs in a hive to remain empty at any time during the season when every available comb should be in use either for brood rearing or for the storage of honey.

Honey Harvesting

Having made sure that all equipment used for extracting honey is perfectly clean and in good order, the beekeeper should set his equipment up for easy working.

The uncapping tray can be fixed firmly with the frame support in position at about table height. The honey extractor should be placed immediately to the right of the uncapping tray for convenient working and should be firmly fixed to a platform on the floor to prevent rocking or vibration when in use. The platform should be built large enough to hold a honey tank and high enough to allow a 60lb. honey tin to be placed under the tap of the extractor and the tank for filling. If these precautions are not taken, any serious rocking of the extractor when the comb cages are revolving may cause damage and breakage of the combs so that they cannot be re-used. Empty and undamaged bee combs from which the honey has been extracted may be returned to the bees immediately and are often refilled with honey in a few days if the honey flow continues, thus increasing considerably the take of honey from the main flow.

An extractor and a tank set up on a stand, showing one of the turnbuckles used for fixing the extractor to the stand. Two or three turnbuckles are required.

After it is extracted the honey is strained through a cloth tied over the tank.

Where comb foundation is used to replace combs broken during a honey flow the bees are forced to build this out into combs before use, with a consequent drop in surplus honey production.

Packing Honey

Where the honey house equipment is conveniently assembled honey can be easily run from the extractor and put through a strainer or straining cloth into the holding tank. At this stage and at this time of the year in northern districts the domestic beekeeper usually runs his honey from the tank into 60lb. tins and stores it until the weather is cool enough for quick granulation to take place, usually about March, before attempting to condition the honey by melting and adding a starter. If, however, a store room with a temperature of about 50 to 57 degrees is available, a fine-grained honey starter may be added to the tank of honey and thoroughly and evenly mixed in before the honey is poured into 60lb. tins and then stored in the room. Under these conditions the honey in the tins will granulate firm in a few days and will have a smooth grain and be ready for table use.

Trends in Sub-tropical Fruit Production and Plantings in New Zealand

By W. A. FLETCHER,
Citriculturist, Department of Agriculture, Auckland

THOUGH no district in New Zealand has a truly sub-tropical climate parts of the Auckland Province are warm enough for a number of sub-tropical fruits to flourish and several are produced commercially. Notable among these are tree tomatoes (*Cyphomandra betacea*), Chinese gooseberries (*Actinidia chinensis*), passion fruit (*Passiflora edulis*), and feijoas (*Feijoa sellowiana*). This article discusses production and planting trends.

THE table below shows the numbers of plants, approximate acreages, and estimated production of these sub-tropical fruits in the various districts in 1956.

An extremely wet autumn and winter in 1956 caused a few losses of tree tomato plants and Chinese gooseberry vines in heavy soils and poorly drained areas at Auckland and Kerikeri, but the winter was mild and the few light frosts recorded caused little damage. Good crops of all varieties were obtained.

Brown spot disease (*Alternaria passiflorae*) of passion vines has been more severe than usual, possibly due to the wet 1956 season and would be likely to affect 1957 yields. Prospects for the 1957 crop of the other sub-tropical fruits were good, but final production figures are not yet available.

Planting Trends and Outlook

Planting trends and market outlook for the various types of sub-tropical fruits grown commercially are as follows:—

Tree Tomatoes

Plantings of tree tomatoes during 1956 were not as heavy as in the previous year, but they were still substantial and the Dominion total of these plants increased by more than 8 per cent. to surpass the peak of 103,000 plants recorded in 1951. Of the 17,000 new plants recorded, 7000 were planted at Kerikeri. The remainder were almost equally distributed between the Auckland, Tauranga, and Te Puke districts. Removals of tree tomatoes amounted to 8500 plants, most of them being lost at Auckland and Tauranga.

Favourable prices for tree tomatoes continued in 1956, but as a result of very heavy plantings made in 1955 production was expected to rise sharply in 1957 to a level of more than 800 tons. The market is likely to be over-supplied at the peak of the season and returns may be lower than in previous years.

Provided no widespread damaging frosts occur to affect the position, a sharp upward trend in yields is likely to continue as recent plantings come into bearing, and there is considerable danger of over-production in future. Export outlets for canned and fresh fruit are being investigated. Just over a ton of fresh tree tomatoes was shipped to Australia in 1955, following up the export of 5½ tons the previous year, but at present there is little prospect of expanding this market very much. Small sample shipments of canned tree tomatoes to overseas markets were to be tried in 1957.

Chinese Gooseberries

There was further expansion of the area planted in Chinese gooseberries in 1956. Nearly 2000 new vines were recorded, mainly at Tauranga and Te Puke, and only 100 vines were removed, because of neglect, at Auckland and Tauranga. Production of these fruits can be expected to almost double within the next 4 or 5 years and supplies reaching the market during the peak of the season are likely to become excessive. Realising this danger, growers are looking to cool storage to spread their crops in future.

[*Sparrow*

Because of heavy plantings in 1955 production of tree tomatoes is expected to rise sharply and the market may be over-supplied at the peak of the season. Export outlets for canned and fresh fruit are being investigated.

Export to Australia and the United Kingdom is also continuing, 26 tons being shipped in 1956. Owing to shipping delays much of the fruit was soft when it arrived and lower prices were received than in previous years.

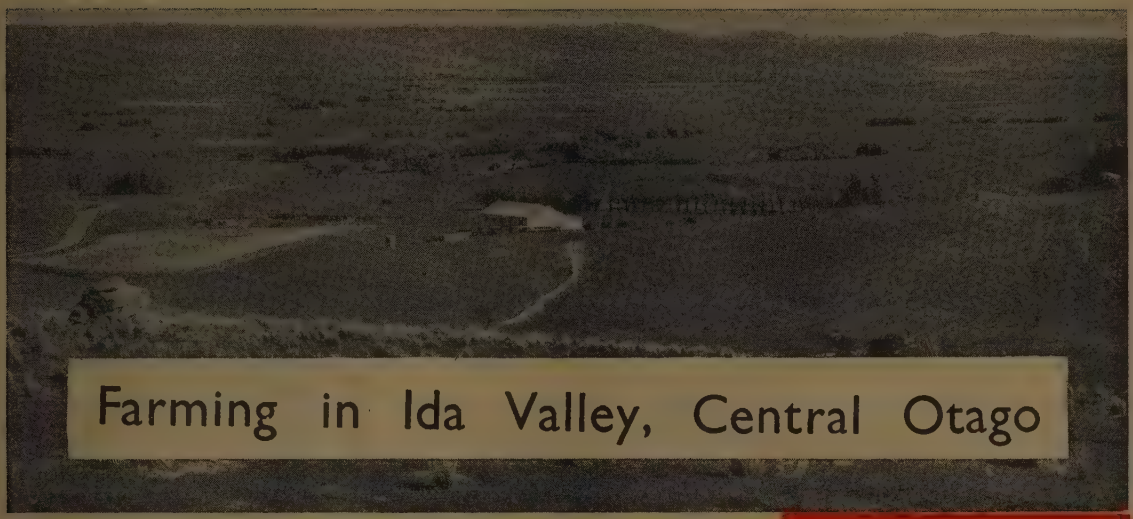
Passion Fruit and Feijoas

The area planted in passion fruit and feijoas remains more or less static. Te Puke is now the main centre of passion fruit production.

ESTIMATED ACREAGES* AND PRODUCTION IN TONS OF SUB-TROPICAL FRUITS IN NEW ZEALAND DURING 1956

District	Tree tomatoes			Chinese gooseberries			Passion fruit			Feijoas				
	Plants	Acreage	Production (tons)	Plants	Acreage	Production (tons)	Plants	Acreage	Production (tons)	Plants	Acreage	Production (tons)	Approximate total acreage	Total production (tons)
Kerikeri ..	43,700	125	330	4,300	36	45	2,500	10	5	2,800	11	5	182	385
Auckland ..	15,400	44	130	2,100	18	40	1,300	5	4	2,200	9	8	76	182
Tauranga ..	29,100	83	115	4,400	37	60	4,300	17	7	3,500	14	14	151	196
Te Puke ..	19,600	56	120	4,500	37	70	6,900	28	55	700	3	1	124	246
Totals ..	107,800	308	695	15,300	128	215	15,000	60	71	9,200	37	28	533	1,009

* Acreage based on 350 tree tomatoes, 250 feijoas and passion fruit, and 120 Chinese gooseberry plants per acre.



Farming in Ida Valley, Central Otago

A view of part of Ida Valley, looking toward Rough Ridge, which forms the eastern boundary of the valley.

By A. H. MOUAT, formerly Field Economist, Department of Agriculture, Dunedin, R. C. STUART, Agricultural Economist, Department of Agriculture, Christchurch, and G. MASON, Research Officer in Farm Management, Department of Agriculture, Christchurch

CENTRAL OTAGO with its low annual rainfall has been the pioneer district in New Zealand in the use of water for farm irrigation. Credit for the first use of water for this purpose goes to a Frenchman named Feraud, who in 1865 applied irrigation water to his farm at Clyde. Subsequently water from mining races was used by individuals to irrigate farmed areas, but it was not until 1912 that large-scale irrigation developed. In that year the State began work on the Ida Valley scheme, and by 1917 was supplying water to irrigators. Outside Otago little is known about farming in this valley, and to obtain information on present land use and systems of farming, and on farm management practices and economic results being obtained, a field survey was carried out by economists of the Extension Division of the Department of Agriculture in March 1955. This article presents some of the results of this survey.

IDA VALLEY, 125 miles from Dunedin by road and 20 miles from Alexandra, is located in the middle of the semi-arid region of Central Otago. It is an inter-montane basin about 1300ft. above sea level, oblong in shape, and enclosed by Rough Ridge (3000ft.) on the east and Raggedy Range (2000ft.) on the west. The valley is open to the north, and there is a gentle slope from its head at Moa Creek. It is rather a featureless landscape with few trees for shelter, except round homesteads.

Climate

The valley is sheltered from outside climatic influences by the surrounding ranges and by the further series of mountain ranges that form the physical pattern of Central Otago. Annual rainfall is low, with less than 20in. on the surrounding hills and only 15in. in the valley. At Moa Creek over the 3 years ended 31 March 1955 rainfall averaged only 14.47in.

The efficiency of the low rainfall is reduced by drying north-west winds and high temperatures averaging 90 degrees F. in summer. Of the average annual rainfall, 65 per cent. falls in the summer half-year when surface heating is at a maximum; that is, an average of 9.67in. in the growing season.

The number of sunshine hours in the year is high, but more than 150 ground frosts are recorded in the valley, with hard frosts (some 20 degrees and more of frost) in winter and some light frosts on clear nights in summer. From mid-April to mid-October low temperatures severely restrict plant growth, and the dormant period and the growing season are about 6 months each.

Soils

The soils of the valley are derived from the mica schist formation of the surrounding ranges. Underlying most of them is a layer of gravel which lies on the deep bed of clays forming the substratum. These deep clays have a relatively high content of soluble salts.

A simple classification of the soils can be made according to the three terrace levels which are recognised in the valley and which are common to most of the inter-montane basins of Central Otago.

1. High terraces: On these terraces, which comprise the dissected remnants of a former plain in the valley, the soils have a foot of schist gravel overlying a deep impermeable clay subsoil. These are the oldest soils of the valley and have shallow topsoils on the gravel, and in some places stones appear at the surface. A hard clay pan has formed in the gravel, and this presents a problem with the application of irrigation water, as surplus water perches on the hard pan to give wet conditions. This problem is evident in some parts of the valley.

2. Intermediate terrace: This is most extensive, and the soils here form the bulk of the farm land in the valley. The soils of deep, fine, sandy loams and loamy sands are probably the most fertile in Ida Valley.

3. Low flood plains: These are narrow areas bordering creeks and form only a small part of the total farm area. The soils are very recent in formation and little of the area is irrigated.

Another soil type is found on the fans along the base of the surrounding ranges and especially on the west side from Moa Creek to Poolburn. Schist gravel has been washed down over the high terrace and a fertile soil has developed on these gently sloping fans which are very suitable for irrigation.

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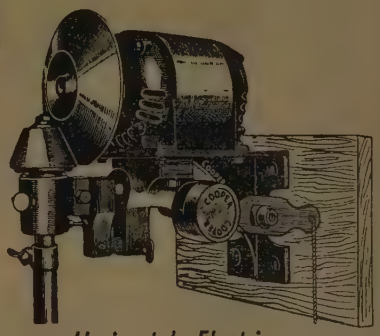

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Drainage

Under conditions of low rainfall and no irrigation the natural drainage was sufficient, but the application of irrigation water introduced problems of underground seepage and waterlogging of low-lying parts, which have now been improved by the straightening and deepening of Poolburn creek.

It is estimated that nearly 1000 acres are poorly drained, 32 farms have no drainage problems, and 21 farms have some drainage problems, a few having poorly drained areas of 100 acres or more.

Irrigation Practices

Water for irrigation is stored in the high country behind the Upper Manorburn Dam. Two parallel races at different levels run along the west side of the valley and one race flowing along the east side is supplemented by water stored at the Poolburn Dam.

Government races take water to the farms where the farmers have constructed contour channels or races to lead the water over their land. The irrigated parts of the valley are mainly concentrated near the main races on both sides of the valley, leaving a large central area of flat land not irrigated.

Most farmers start irrigating in October and finish in March, but this varies according to the seasonal rainfall and the amount of irrigation water available for the season. The full allocation of water is made on the basis of 18in. per acre per annum of the irrigated area signed for, but since 1947 a shortage of water has resulted in reduced allocations. The shortage arose mainly from the low rainfall in recent years in the catchment areas serving the dams.

When full allocations are available farmers generally make three or four applications of water on their irrigated area in the season. They consider that four such applications are required to give the best results in pasture production. With the restricted supplies of recent years farmers have generally reduced the acreage irrigated and the number of applications of water, and also the amount of water applied each time.

Land Utilisation

Data were collected from 53 farms all or portions of which are in the southern part of Ida Valley that is served by the irrigation scheme. The total area of these properties was 67,206 acres, of which 29,507 acres were on the valley floor and 37,699 acres on the surrounding tussock hills. The area of the valley floor affected by the irrigation scheme comprises 33,000 acres, which means that information was collected in respect of 89 per cent. of the area.

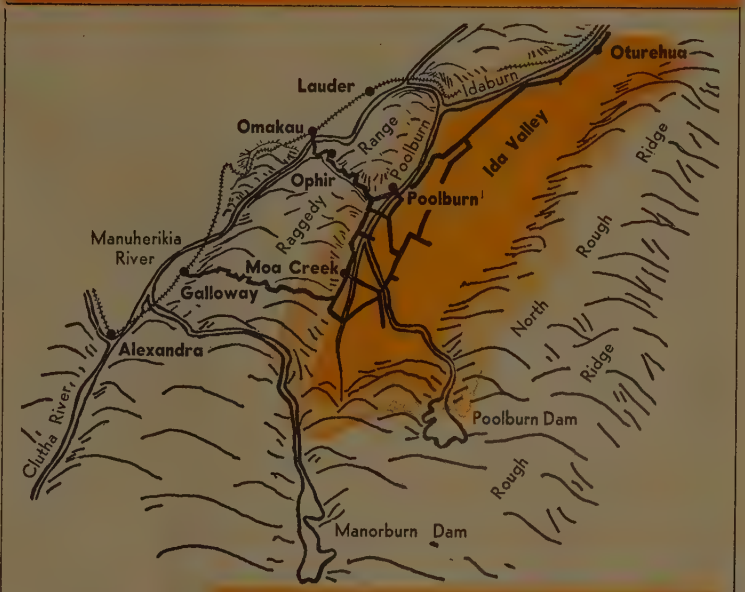
As the tussock hills are of poor quality and provide very little grazing except for limited periods of the year, the valley floor area was taken as the significant area, and much of the data set out in the tables relate to this area. Of the total area of 67,206 acres, 51,951 acres, or 77 per cent., is held on leasehold tenure, and the remaining 15,255 acres, or 23 per cent., is freehold. Most of the tussock hill country is leasehold, and the valley floor has about equal areas of freehold and leasehold land.

There was a considerable variation in the size of property on the valley floor, 20 being in the range 250 to 500 acres and 16 in the range 500 to 1000 acres. Seventeen of those with land in the valley also held tussock hill blocks, the area of these varying from 645 acres to 5700 acres.

Details of how the land was used on the valley floor were obtained for the summer of 1954-55, and this information is given in Table 1 on page 589.

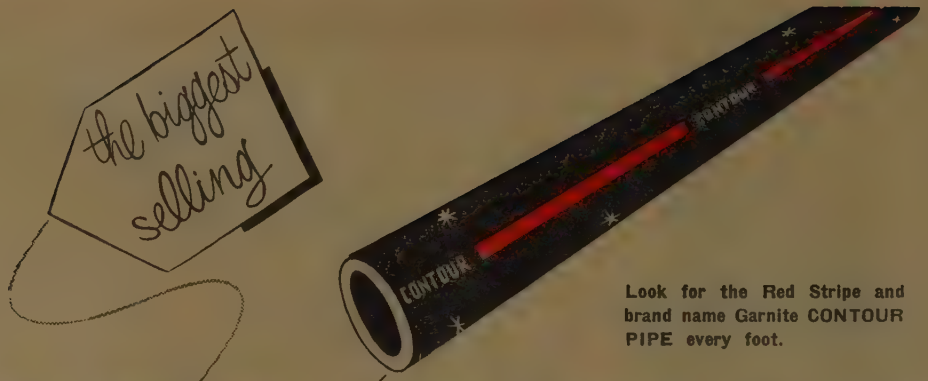
The area of new pasture sown for 1954-55, 1 per cent. of the effective valley floor area, shows the small amount of cultivation and renewal of pastures carried out. That this season the figure was lower than normal is

FARMING IN IDA VALLEY



Ida Valley and its surroundings.

▼ Location of the survey area.



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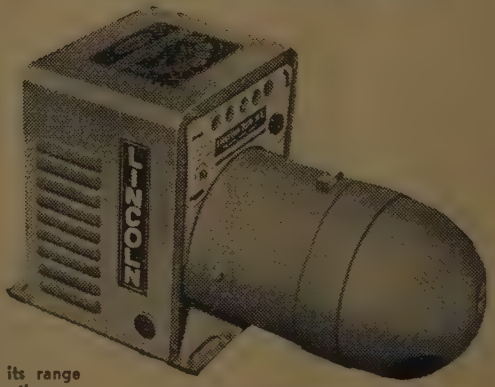

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TABLE 1—LAND UTILISATION IN SUMMER 1954-55

	Acres	Effective valley floor Per cent.
Pasture under 1 year old ..	294	
Lucerne under 1 year old ..	402	
	696	2.4
Pasture 1 to 5 years old ..	3,710	
Pasture over 5 years old ..	22,036	
	25,746	88.9
Lucerne over 1 year old ..	1,557	5.4
Cash crops	94	0.3
Summer fodder crops ..	290	1.0
Winter fodder crops	417	1.4
Fallow	163	0.6
Effective valley floor ..	28,963	100.0
Waste, buildings, etc. ..	544	
Total valley floor ..	29,507	

indicated by the 3710 acres of pasture which had been sown in the previous 5 years (annual average of 2.6 per cent.), and the reason given is the reduced irrigation water supply for the 1954-55 season. Many farmers stated that because of the dry soil conditions that year they would not risk sowing down pasture.

Some excellent irrigated pastures of up to 40 years old were seen, and the low level of pasture renewal emphasises the fact that adequately irrigated pastures have a long productive life. On the other hand, dry-land pastures deteriorate in only a few years. A typical pasture mixture includes perennial ryegrass (20lb.), cocksfoot (3lb.), cowgrass (3lb.), and white clover (2lb.). These are generally sown in November and December

FARMING IN IDA VALLEY

The application of irrigation water introduced problems of underground seepage and waterlogging in low-lying parts. It is estimated that nearly 1000 acres in the valley are poorly drained.

▼ Irrigating pasture by wild flooding.

About 90 per cent. of all ewes in the valley are Romney cross for the production of fat lambs and wool.

with rape or turnips, and the broadcast method is most popular for sowing.

Winter feed is provided mainly by making lucerne hay. Areas in winter fodder crops amounted to only 1.4 per cent. of the valley floor for the 1954-55 season and 2 per cent. for the previous season. About 1400 acres, or 4.8 per cent., of the valley floor area was cut for hay. This is an average of 26 acres per property.

The fact that lucerne over 1 year old occupies 5.4 per cent. of the area and that more new lucerne than new pasture is being sown indicates the importance of lucerne in the valley.

The amount of liming done in the valley, on 1 per cent. of the pasture and lucerne over 1 year old, is very small. Superphosphate topdressing was carried out on 8.2 per cent. of the area. This indicates the natural fertility of the soil, which, from limited soil test results, appears to be well supplied with the major elements required for plant growth.

Stock Management

Ninety per cent. of all ewes are Romney cross for the production of fat lambs and wool. The remaining ewes, mainly halfbreds, are confined to those properties in the valley which have tussock hill country as well, and where wool is the chief product and surplus lambs are sold as stores.

Fluctuation in supply of irrigation water affects the method of replacement and the numbers required in the Romney-cross flocks. After a season of restricted water for irrigation winter feed supplies are adversely affected and flock numbers have to be reduced by heavier culling of ewes and by retaining fewer replacement stock, or by buying fewer ewes where this method is practised. About two-thirds of the Romney ewe flocks are maintained by keeping ewe hoggets to provide the bulk of replacements. The remaining Romney flocks (one-third) are maintained by the purchase of 2-tooth ewes.

In years of water shortage the irrigation farmer, depending on water for a considerable part of his production, has no alternative but to sell part of his flock. Because only 33⅓ per cent. of the full water quota was available in the 1954-55 season, fewer breeding ewes were carried in the autumn of 1955 than in the spring of 1954.

The most popular ram for replacement stock is the Romney, and fat lamb sires are generally Southdown, with Border Leicester and Border Leicester x Southdown being used to some extent.

The acreage of lucerne is expanding, as the crop has proved valuable for grazing and fattening as well as for hay production.

Ewes are generally kept until they are 5 to 6 years old, when they have produced 4 or 5 lambs, and they are then disposed of to the works as fat ewes, provided there is sufficient feed to fatten them. Lambing takes place in late September to early October. A high proportion (40 to 60 per cent.) of lambs tailed are sold fat off the mothers by the beginning of February and these represent about two-thirds of all fat lambs sold.

There is very little cropping for lamb fattening (1 per cent. of the valley floor area being used for this in 1954-55), but new grass is generally sown with either rape or turnips and this supplements irrigated pasture and lucerne for finishing off the lambs. For the two seasons 1953-54 and 1954-55 the average lambing percentage of 114 is fairly high. The average weight of fat lambs for these seasons was 34lb. and 31.5lb. respectively, which reflects the necessity for disposing of lambs early in seasons of greatly reduced irrigation water, as in 1954-55. Winter feed crops are not grown to any extent and lucerne hay provides the bulk of winter food supplies. Ewes are lambed down on new pasture where available.

Those properties which have tussock hill country use this to carry the ewes for a short period in autumn after weaning in late January or early February. Flushing of ewes before tupping is dependent on having adequate supplies of irrigation water in autumn to provide succulent pastures for this purpose. Lucerne also provides grazing during this period.

The main shearing period is November and December, though in the period under investigation six properties shore their ewes before lambing. The average weight of wool per sheep shorn was 10lb. and 9.8lb. respectively for the seasons 1953-54 and 1954-55. Beef cattle are now carried to only a limited extent.

There is considerable dependence on irrigation water for stock water supplies, and about one-third of all farms are wholly dependent on irrigation water. Other sources are bores, wells, and creeks, which flow intermittently. Scarcity of stock water becomes acute when irrigation quotas are reduced and creeks dry up. It is customary for farmers to reserve part of their quotas to fill up lagoons and dams for autumn and winter.

Economic Factors

Financial details were collected for the 1953-54 season, in which there were reasonable supplies of irrigation water, the farmers that season being reduced to 80 per cent. of the normal water supply against a reduction to 33⅓ per cent. for the 1954-55 season.

Farm Capital

Farm capital represents the total valuation of land and improvements, plant, machinery, and stock. The land and improvements are based on the latest Government valuation figures, plant and machinery figures are estimated resale value, and stock has been valued at conservative market rates ruling in 1953-54.

On the smaller farms capital is high at £47 10s. per acre, but as farms increase in size this figure falls. For farms over 1000 acres the average is £22 per acre, and the average for all farms is £28 14s. per acre. Total farm capital per ewe equivalent ranges between £13 8s. and £14 16s. Table 2 shows the farm capital structure for the 53 farms in the survey.

TABLE 2—FARM CAPITAL STRUCTURE

	£	Per acre £ s. d.	Per cent.
Unimproved value of land	228,090	7 18 0	
Value of improvements	336,940	11 12 0	
Capital value ..	565,030	19 10 0	68
Livestock	182,913	6 6 0	22
Plant and machinery	85,157	2 18 0	10
Total farm capital	833,100	28 14 0	100

The capital value of land and improvements forms a large part of the total farm capital.

Plant and machinery can be shown in terms of power machinery, with engines attached, and non-power machinery:—

	£	Per cent.
Power machinery (tractors and trucks)	56,280	66
Non-power machinery ..	28,877	34
	85,157	100

The capital invested in plant and machinery in Ida Valley averages £2 18s. per acre, which is low compared with that of the cropping areas, such as the South Otago downlands at £4 6s. per acre. Machinery generally was in fair condition, with little attempt at adequate housing.

Gross Farm Income

Gross farm income comprises the receipts from livestock and other products sold during the 1953-54 season plus or minus changes in stock valuations. Table 3 shows the contribution

Ida Valley once produced a considerable number of prime fat cattle, but the number has decreased in recent years.

Depleted country on Raggedy Range, which forms the western boundary of the valley.

made by each item as a percentage break-up of gross income.

TABLE 3—COMPOSITION OF GROSS FARM INCOME

Item	Gross farm income Per cent.
Wool	42
Fat lambs	39
Other sheep	12
Sub-total	93
Cattle	6
Crops, miscellaneous	1
	100

The main feature of farm income is that 93 per cent. of the gross farm income comes from sheep products, of which wool and fat lambs are the two chief items. Fat lambs do particularly well in Ida Valley and a large percentage are sent to the works fat off the mothers.

Included in other sheep sold are cast-for-age ewes and rams and fat wethers. Cash cropping is insignificant, accounting for less than 1 per cent. of farm income. Cattle sold are not very important, contributing only 6 per cent. to income, but this could be higher with assured and adequate water supplies each year.

With the total valley area at 33,000 acres the total annual revenue to the farming community is about £338,000.

Total Farm Expenditure

The expenses shown in Table 4 as a percentage break-up include all the routine farm operating expenses, depreciation allowances on all buildings, plant, and machinery, and interest charges on the valuation of livestock and plant.

TABLE 4—COMPONENTS OF FARM EXPENDITURE AS PERCENTAGE OF TOTAL EXPENDITURE

Item	Per cent.
Wages and contract	14
Repairs and maintenance	8
Charge for irrigation water	3
Tractor, truck, and car expenses	8
Lime, fertiliser, and seed	8
Cartage	3
Sheep:	
Flock replacements	18
Store sheep	1
Cattle	6
Other expenses	10
Depreciation	12
Interest on value of stock and plant	9
Total	100

The largest item in Table 4 is expenditure for flock replacements, 18 per cent. of total farm expenses. This high figure reflects not only the normal purchases that are required annually to maintain the ewe flock, but also some additional purchases to restore the sheep numbers from the low levels caused by the forced sales of stock when irrigation water was short in previous years.

The next largest item is for wages, which are no higher than for corresponding areas without irrigation. This would be reasonable, as the number of days spent on irrigation work are not high when the water is restricted as it has been in recent years. When full supplies of water are available and even excess water may be bought the demand on labour may cause the wages item to rise a little.

Cattle purchases shown are well below those expected in a normal year when full water is available. The Ida Valley once produced a number of prime fat cattle, but this production has been reduced considerably in recent years.

Irrigation charges show as a low item in the expenses, as do the outlays on lime, fertiliser, and seed.

Owner Surplus

Owner surplus is the amount available from farm receipts after meeting all running expenses, depreciation on all assets, and interest on the value of stock, plant, and land. In other words it is the amount available to a farmer as a reward for managing and working on the farm.

Owner surplus per farm tends to rise with farm size, but the surplus per acre tends to fall as farms increase in size. The owner surplus per acre averaged 85s. 3d. for the 43 farms for which these details were available; 15 farms were below this average and 28 farms above. The surplus per farm is at a very satisfactory average figure of £2358, and 23 farms are below and 20 farms above this figure. Of the 43 farms, 35 had owner surpluses over £1000.

Owner surplus per acre varies according to different classes of farms in the valley. Farms with over 50 per cent. of the farm acreage irrigated and with no tussock run-off, showed an average owner surplus of 105s. 6d. per acre of farm. Farms with less than 50 per cent. of their land irrigated and with no tussock country showed an average surplus of 63s. 6d. per acre of farm. Farms with tussock run-off and some irrigation had an average surplus of 82s. 6d. per acre of valley land.

Out of the owner surplus must be paid living expenses, income tax, savings, and reinvestment in the farm. This capital reinvestment averages £285 per farm, of which a half was spent on dwellings, a little more than one-third on plant and machinery, about one-tenth (or £28) on land, and the balance, about £11, on farm buildings. Excluding dwellings, capital reinvestment was disappointing, and this was generally reflected in the appearance of the farms and the attitudes of the farmers.

Though farmers in the valley are receiving sound net financial returns, production could be increased considerably and this increase maintained if adequate irrigation water were available each summer, and also provided this water was used to the best advantage. From about 49,000 breeding ewes carried on 33,000 acres of the valley floor it is estimated that 66,000 breeding ewes could be carried; also beef breeding cows could be increased. These stock increases could result in an increase in the output of wool from about 1870 bales to 2410 bales and in lamb meat from approximately 12,300cwt. to approximately 17,000cwt.

Low-density Hay Baling

MORE than a hundred farmers in Southland have used a new and less expensive baler to produce hay bales of lower density than those from the orthodox baler. These bales when left in the paddock shed light rain, but are loose enough to dry out and reach good condition. Furthermore, they are light enough to be handled with a pitchfork, and many farmers are stacking them in the open and are finding that the stacks are comparatively weather-proof.

A low-density baler in lucerne. Two bales are on the rack at the rear of the baler. The machine is compact and weighs less than a ton.

LOW-DENSITY baling involves a rather different technique from normal haymaking. The crop can be baled earlier than it would normally be because the looser packing of the bales enables them to mature evenly without going musty. As a result superior quality hay is obtained, particularly with lucerne.

The first cut of lucerne often contains weeds which retain moisture and often seriously lower the quality of the hay or spoil it completely. Many farmers in Southland are finding that low-density baling enables them to harvest the first cut of lucerne satisfactorily.. With subsequent cuts the lucerne can be baled before the leaf becomes brittle. After the bales have been left in the paddock to condition, excellent green hay is obtained. This feature alone is enough to make low-density baling popular.

An additional advantage is the ease of handling the bales. Bales weighing 20lb. to 70lb. can be produced, but bales of 30lb. to 35lb. are recommended. These bales can be handled easily with a pitchfork. This is easier on the worker's hands in particular, and there is also less chance of twine breakage or bales falling apart.

Pitchforking from paddock to trailer and from trailer to stack is usual, but the use of a front-end loader in the paddock has proved successful and this system is gaining support. One man on a tractor equipped with a front-end loader or push-off stacker can bring in sufficient bales to keep two stackers busy if the stack is in the same paddock or nearby. Three men with a front-end loader have stacked 3000 low-density bales in an 8-hour day. This quantity is equivalent to about 1400 ordinary bales con-

By L. H. WESTON,
Machinery Instructor,
Department of Agriculture,
Dunedin

A side view of the low-density baler at work, showing the power take-off drive. The sledge at the rear is designed to slide the bales to the side, keeping them clear of the tractor path on the next round. This is an advantage when windrows are too heavy to be raked two into one.

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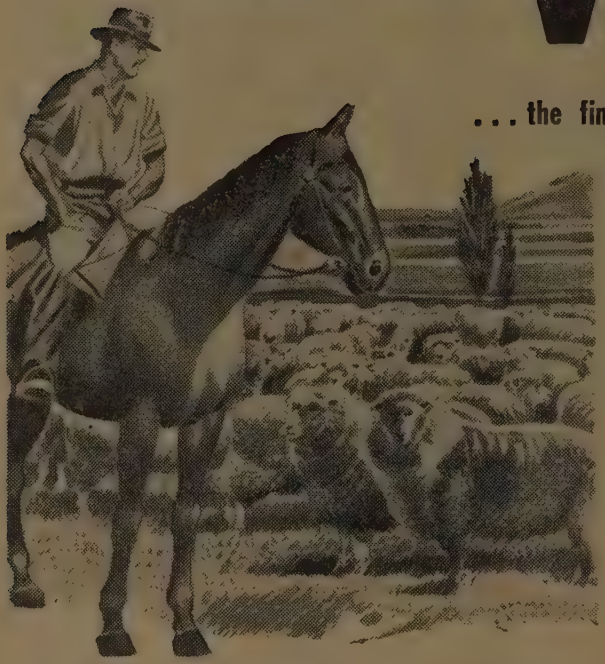

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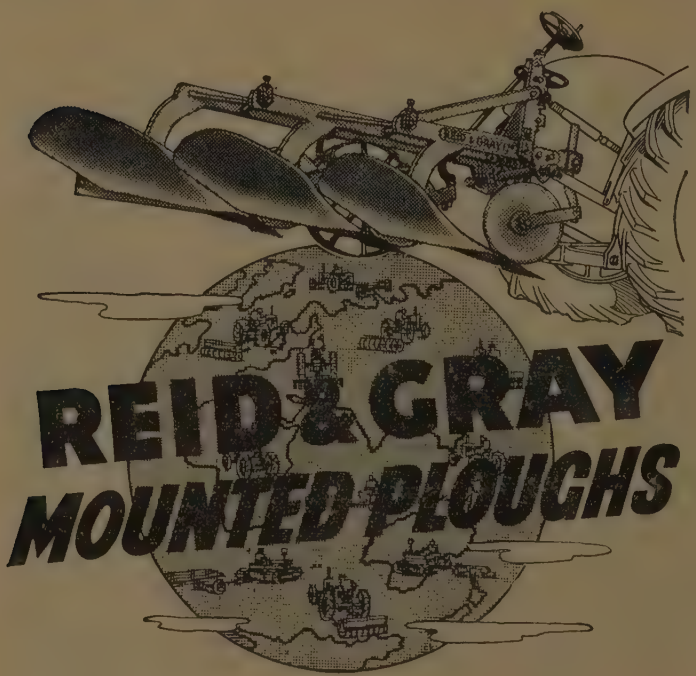

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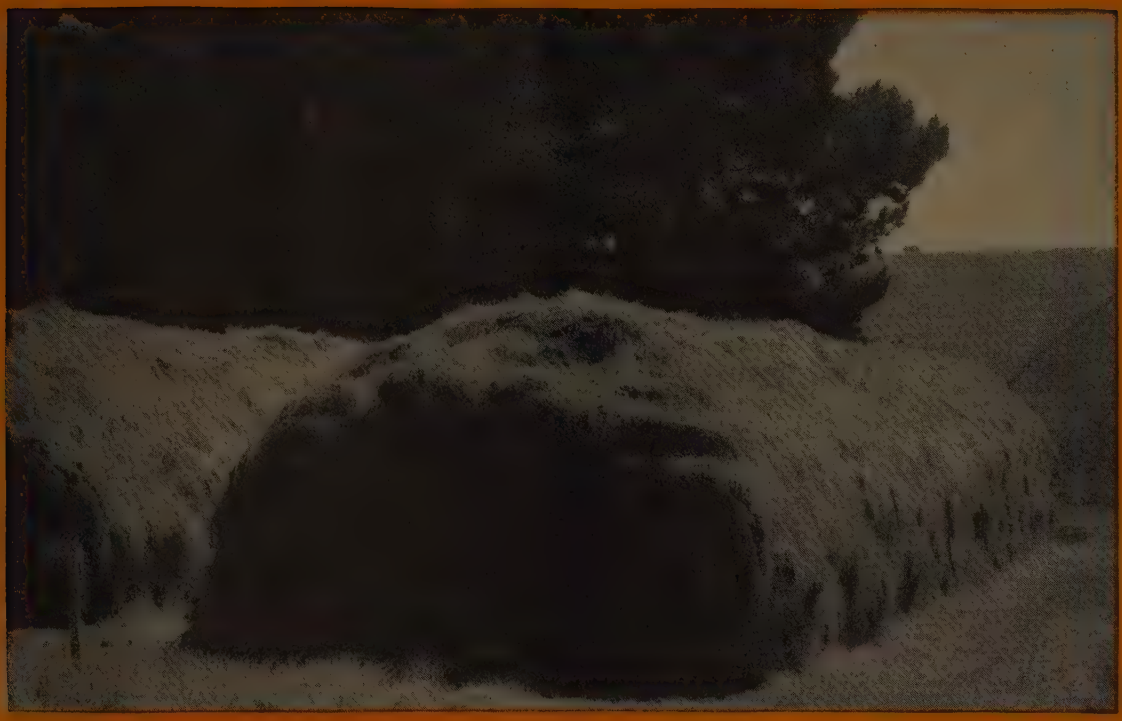

Two stacks in the lee of a shelter belt. The neat appearance and the thatching that turns the weather can be seen.

taining over 40 tons of hay. Other types of paddock loaders would probably require modification for low-density bales.

The low-density bale has a rough side which, when placed with the stems pointing down, forms a thatch. Moreover, the rough edges of the bales knit together, assisting this thatching action and causing the bales to hold together in the stack. This attribute has prompted many farmers to stack hay in the open or more usually in the lee of a shelter belt. Such stacks turn rain surprisingly well and only 2in. to 3in. of the exposed bales appear to deteriorate. It is also noticeable that stacks of these irregularly shaped bales are remarkably stable and do not require propping up as do all but the best-made stacks. In good seasons when surplus hay is conserved the success with which low-density bales can be stacked in the open would be of particular value.

Treatment before Baling

Tedding or turning of the hay once is advantageous for all but the lightest crops, but light crops should be raked, two rows into one, for ease of handling. Heavy crops should not be raked into double windrows, for this makes work difficult for tractor and driver and in addition results in large, uneven bales. Where single windrows are taken some bales may fall in the path of the tractor. In the illustration on page 593 a sledge is shown which slides the bales to one side, preventing this inconvenience.

Generally treatment before baling should aim at producing a windrow that is even and not too dense. If this is obtained, the bales will be of fairly even size and weight.

Description of Baler

The machine could be described as a "straight-through" baler because the bales are discharged side on instead of end on as is usual. A rotary steel pick-up lifts the hay to within reach of the packer arms. The hay is then pressed into a bundle rather like a sheaf, but with two strings tied around it. A rack at the bale outlet holds one or two bales against the bale chamber for the packing mechanism to work against.

The baler is driven by the power take-off, and a medium-sized tractor of about 25 belt horsepower is capable of the work. A constant-running, live power take-off on the tractor is preferable. On undulating ground a larger tractor may be necessary, though the baler itself weighs slightly less than 1 ton.

Only one model of this machine is readily available in New Zealand at present. It is German made and sells for about £500. There are three adjustments, the density screws, the tripping adjustment (which alters the breadth of the bale), and lastly the essential pick-up height adjustment. Though the first machines gave a little trouble, the model available at present is very reliable, stoppages and breakages being virtually unheard of, unless caused by crop conditions or an unexpected hazard in the paddock.

A rate of from 10 to 14 bales per minute is usual. The low rate may be necessary if the bales are stacked on a sledge; otherwise the man on this operation may be overtaxed. Generally a rate of 5 to 7 tons per hour can be expected.

Twine Costs

The low-density bale of 30lb. to 35lb. weight requires some 8ft. of twine

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compared with about 17ft. for a normal bale. However, when it is considered that nearly twice as many bales will be produced under the new system, the saving in length of twine is not great. However, with the use of a lighter twine only 80lb. of twine is required for 3000 bales, thereby appreciably reducing the cost of this item.

Materials Baled

Meadow hay, clover hay, lucerne, and oat crops have all been successfully baled. The machine was originally designed to take straw discharged from a header harvester and it may still be used for this purpose in New Zealand to a limited extent. Again the even windrow that is not too heavy is desirable in all crops if uniform bales are to be produced.

Stooking and Stacking

Low-density bales do not require stooking if baled in first-class order, but it will probably assist carting in if the bales are dumped in heaps. A small sledge trailed behind the baler will carry about nine bales. If, however, the bales are clearly out of condition, drying out would be accelerated by stooking in the same manner as for sheaves, care being taken to turn the thatched side of the bale outward.

Well-built stacks need no cover, though the protection of a shelter belt of trees against winter storms would undoubtedly be an advantage. Stacks can be built with overhanging eaves so that the sides are better protected from rain.

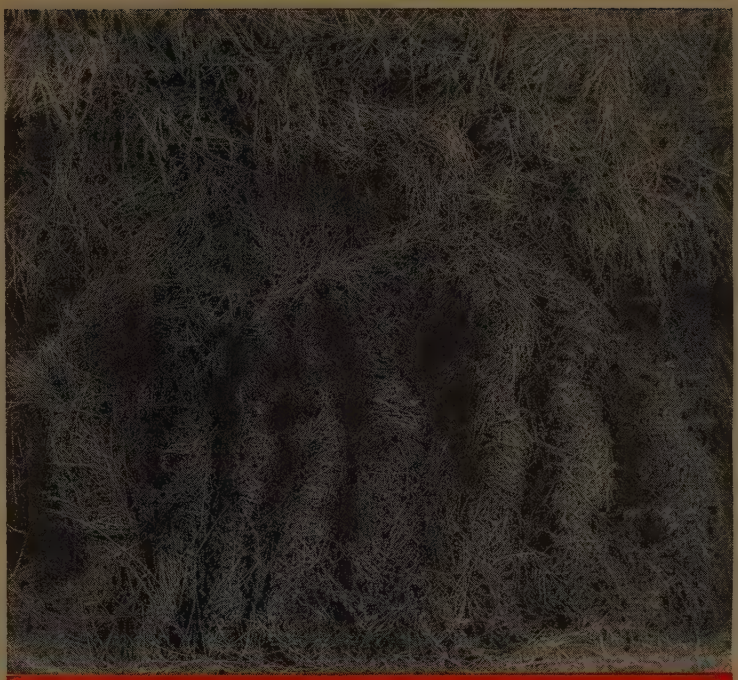
Feeding out

Handling with a pitchfork also makes feeding out easier, facilitating the stacking of the load on the trailer. When the bales are being fed out in the paddock it is not necessary to cut the strings, as the bales are loose enough for stock to help themselves. The result is that wastage is practically nil.

When is This Baler Warranted?

The great advantage of owning a baler is being able to bale at the right moment. In addition this baler has many other points which appeal to farmers.

The cost of baling by this method will stand comparison with contract charges. The fixed costs with repairs and maintenance can be assessed at £90 per year. This must be balanced by saving in running costs, that is, the cost of twine, tractor, and driver, as against a contract price. If a contractor charges 1s. per bale, it is probable that 31s. or more per ton will be saved (contract bales average 56lb.). If a farmer makes 60 tons of hay (some 2400 bales) each year, it will pay him to have a low-density baler. Of course if the owner bales 2000 low-density bales for a neighbour and charges 6d. a bale, he need bale only 44 tons, some 3000 bales, for himself to show a profit.



A low-density bale opens out like a concertina. The bales are loose enough to be fed out to stock without the string being cut.

Advantages and Disadvantages

The advantages of low-density baling may be summarised as follows:—

1. Low cost.

2. Easier made, good-quality hay. (It should be noted, however, that for good hay, quality material and good haymaking principles are still necessary).

3. Bales stooked in the paddock withstand weather and come to condition readily.

4. Stacks in the open turn the weather.

5. Bales of about 30lb. weight can be handled with a pitchfork.

6. Bales may be fed out without cutting string.

The disadvantages are as follows:—

1. There are more bales to handle.

2. If bales are to be carted or sold, cartage costs will be higher.

3. The hay crop will take up more space than with ordinary bales.

4. Bales unstooked will absorb more water if left out in unfavourable weather.

The higher cartage costs item is the only real objection. These costs make the baler rather unsuitable for farmers who make a practice of selling hay. Farmers will probably find handling a larger number of bales with a pitchfork easier work than handling normal bales. There is less need for these low-density bales to be stacked under cover if care is taken with the placement of the top bales. Finally, though these bales may absorb more moisture, they dry out in less time and dry out more successfully.

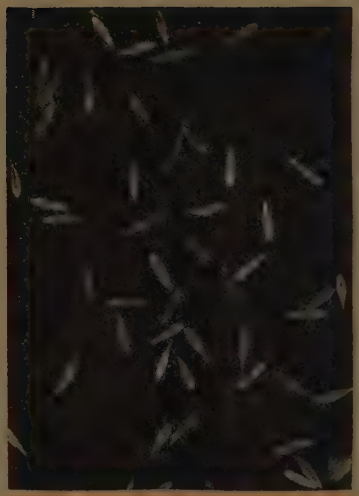
Many farmers will be repelled by the untidy, low-density bale, but they should reconsider its value for lucerne in particular and its advantages where haymaking weather is unreliable. Many Southland farmers have found it easier to make good hay which, furthermore, can be successfully stacked in the open. Such hay has proved to be in good order even after 2 years. Low-density baling has many advantages not at first apparent and has proved its worth in Southland.

Seed Production in New Zealand

Crested Dogstail

By A. STUART,
Assistant Fields Superintendent, Department of Agriculture, Dunedin

CRESTED dogstail (*Cynosurus cristatus*) is adapted primarily to cool, moist regions. In Europe it is best known in England, Holland, and Switzerland; in New Zealand it is grown principally in Southland. With the introduction to certification of the more permanent strains of perennial ryegrass, and with the increased topdressing of grassland, the sowing of crested dogstail seed in New Zealand has declined, but on hill country which suits it and on the lighter second-class soil types generally it is still a valuable constituent of the pasture sward.



Crested dogstail seed.

Seed heads of crested dogstail.

THOUGH crested dogstail is generally regarded as a perennial, it has been ascertained that the majority of plants are annual or biennial. It owes its persistence in pastures mainly to its free seeding and to the fact that stock do not eat the seed head readily. It is essentially a bottom grass that can be smothered out easily by rank growth of other species. Crested dogstail owes its popularity to its earliness in spring and the high palatability of its leafage. In summer it runs rapidly to seed and during that period little leaf growth is produced.

The leaf growth of crested dogstail is not readily distinguishable from that of perennial ryegrass, and in early spring most farmers give credit for this growth to perennial ryegrass until the seed head appears. The base of a crested dogstail plant removed from the soil is an unmistakable yellow, whereas the base of a perennial ryegrass plant, as in all ryegrasses, is distinctly reddish.

Southland is the chief producer of crested dogstail seed, more than two-thirds of the total area harvested each season being in that district. Most of the balance of the seed is produced in Canterbury and Otago. In 1946-47 a peak acreage of 11,907 was harvested for seed, and in 1954-55, 6439 acres were saved for seed.

The average yield per acre is about 150lb., but yields of up to 350lb. per acre are occasionally obtained from special sowings.

Special Seed Crops

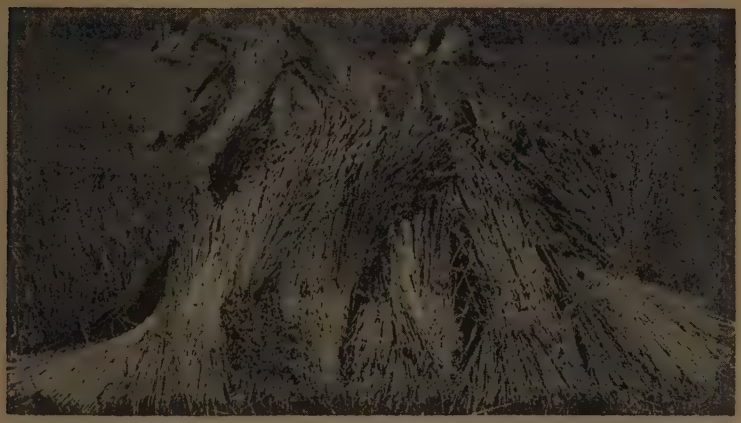
As with most other varieties of grass and clover seeds the growing of this crop for seed has become rather a specialised job. Crested dogstail intended for seed production is now sown pure in spring or early summer, broadcast at 16lb. to 20lb. per acre or drilled in at 14lb. to 16lb. per acre. After being harvested for one seed crop the paddock is reploughed.

Alternatively the dogstail may be broadcast at 16lb. per acre with 2½lb. of Certified Pedigree or Mother white clover seed. The dogstail seed is harvested in the year after sowing and the white clover seed in the second year. Thereafter the paddock may be used as a grazing area or ploughed up according to the condition of the paddock or the farm crop rotation. Those crops specially sown for seed production are generally cut with the binder and stooked, the stooks being left to dry out thoroughly (generally in about 14 days according to the weather) and then threshed.

Crops are generally ready for cutting about the end of January. It is essential that seed crops be cut at the correct stage, as this determines to a large extent the important feature of

Areas where crested dogstail is harvested are shown by crosses on the maps.

HARVESTING CRESTED DOGSTAIL SEED



▲ Crested dogstail in swath being picked up by a header harvester.

← In stook.

▼ Seed from the stripper is loosely bagged and dried by being suspended over fencelines.

CRESTED DOGSTAIL SEED PRODUCTION

On much of the plains and rolling country of Otago and Southland crested dogstail is an important pasture plant.

good colour in the seed. Good dogstail seed is a golden yellow, but if the crop is cut too late, the seed becomes very dark brown. As this dark seed is not sought by the overseas buyer, the grower should take care to ensure that the seed is harvested at the correct stage.

As soon as the seed is coloured and can be rubbed out of the heads in the palm of the hand and the rubbed-out seed retains its shape when rolled with fair pressure between the palm of the hand and the thumb, the crop may be cut. The straw is very slippery, so care is necessary when handling the sheaves for stooking.

Many years ago it was the practice to sow some perennial ryegrass with the dogstail. The ryegrass straw, being less slippery than the dogstail straw, helped to keep the sheaves together. This is no longer done, because small ryegrass seed is very difficult to dress out of the dogstail seed and the seed trade is becoming more and more selective in buying lines of high purity.

Crested dogstail threshes readily provided it is allowed to dry out thoroughly in the stook.

An alternative method of harvesting, particularly if the crop is not very dense, is to cut with the binder and run the cut material off without tying. This "windrowed" material is left until thoroughly dry and then picked up and threshed with the header harvester.

Another method used generally with lighter crops is to cut with a 6ft. mower fitted with an inside shedder so that the swath is reduced to about 4ft.; the cut material is left to dry out and then picked up and threshed with a header. Windrowing is, however, not very popular, as there is risk of inferior colour in the seed due to late harvesting and the germination of the seed may be affected.

Ordinary Seed Crops

A considerable proportion of the dogstail seed is harvested from areas which have not been sown out specially for seed production. On much of the lighter land farmers often include up to 3lb. of crested dogstail seed per acre in the general pasture seed mixture. As these pastures increase in age the amount of dogstail tends to increase in the sward. It is frequently impossible to stock these paddocks sufficiently intensely to keep the dogstail from running to seed. These pastures may not be closed up at all for seed production, but in late January or February (or whenever the seed heads are sufficiently far advanced) and provided sufficient seed heads are showing, a stripper is run over the area.

Stripped Seed

Generally the stripped seed lacks the golden yellow of binder cut seed, the reason being that stripping has to be delayed until the seed is fully mature. If the seed is stripped too early, it will heat in the sacks. For this reason, and as a precaution, it is advisable to fill the sacks only loosely and hang them on a fence to dry out. The sacks should be shaken up and turned every day until the seed is dry. Alternatively the stripped seed may be spread in a thin layer on top of a cover placed on the grating in the wool shed. This also involves turning the seed every day.

Stripped seed, though lacking colour, is generally of good germination provided it has not heated. Because this seed is generally taken from paddocks which have been sown with a pasture mixture, there is usually some ryegrass seed present. This ryegrass seed, particularly that which is the same size as the dogstail seed, is difficult to dress out and the purity of lines of stripped seed is therefore generally not as good as that of lines harvested by the binder cutting method.

Seed Dressing

Dressing losses can be high, depending partly on the method of harvesting, stripped seed usually having a greater amount of impurity than binder harvested seed.

The most difficult seed impurities to dress out of crested dogstail are Californian thistle, ryegrass, and catsear. Hairgrass and sweet vernal can also be troublesome if the awns have been removed during threshing. Yorkshire fog, particularly if it has been shelled, is also a source of dressing loss, as the shelled seed is almost the same size as the crested dogstail.

A good line of crested dogstail should have a purity of 98 per cent. and a germination of 90 per cent.

Export of Seed

As the quantity of seed produced in a normal season is far too great for New Zealand's requirements, an export trade has developed. The quantity exported frequently includes a carry-over from the previous year's production, which accounts for the fact that in some years the export figure exceeds that for production.

Great Britain is the principal importing country, but at various times seed has been exported to most European countries, including France, Denmark, Holland, Belgium, Sweden, Switzerland, Eire, and, before 1933, Germany. In addition Australia, Canada, the United States of America, South Africa, and the Falkland Islands have bought seed.

Use in New Zealand

The use of this seed in pasture mixtures has declined to some extent because farmers are inclined to blame the seed stalk and seed head for some foot trouble in sheep. However, it is still included in many mixtures for use on second-class country, particularly where rainfall is adequate. Dogstail is a bottom grass which will stand more or less continuous or set grazing such as is practised on many sheep farms, particularly in the south.

A Comparison of the Effects of Copper Methylarsenate and Finely Ground Phenothiazine on Worms in Sheep

By D. C. ELLIOTT, Technician, P. L. THOMAS, Parasitologist, and B. O'GRADY, Technical Trainee, Department of Agriculture Animal Research Station, Wallaceville

IN the past 2 years a preparation containing copper methylarsenate has been available in New Zealand for the treatment of worms in sheep. Recently a trial was carried out at the Wallaceville Animal Research Station to compare the efficiencies of copper methylarsenate and finely ground phenothiazine in removing worms from sheep.

A MOB of 42 hoggets (average weight 53.7lb.) with a mixed infestation of worms was divided into three groups of 14 each. One group was dosed with 2.08 gm. of copper methylarsenate per sheep, one with 20 gm. of fine phenothiazine per sheep, and the other was left undosed.

Several days later all animals were slaughtered and their alimentary tracts collected so that the worms remaining in each sheep could be counted. The numbers of worms remaining in the copper methylarsenate group and the phenothiazine group, when compared with the numbers remaining in the untreated (or control) group, showed that phenothiazine is far more effective than copper methylarsenate in removing worms from sheep.

Copper methylarsenate and phenothiazine were about equally effective in removing the large stomach worm (*Haemonchus contortus*). On the other hand, the medium stomach worm (*Ostertagia circumcincta*) and the black scour worm (*Trichostrongylus colubriformis*) were unaffected by copper methylarsenate, but the numbers of both were substantially reduced by phenothiazine. The sheep tapeworm (*Moniezia expansa*) was effectively removed by copper methylarsenate. Detailed results are given in the table below.

No tapeworms were found in any of the sheep dosed with copper methylarsenate, whereas the control group had 11 out of 14 sheep infected with a mean of 6 tapeworms (*Moniezia expansa*) per animal, and the phenothiazine-dosed group had 12 out of 14 sheep infected with a mean of 7 tapeworms per animal.

Comparison with previous trials showed that copper methylarsenate was not superior to bluestone-nicotine sulphate in removing the large stomach worm, and was only slightly superior against tapeworms.

Because the sheep were picking up infective larvae of the large and medium stomach worms during the course of the trial, numbers of immature worms were present in all groups. This accounts for the fact that the percentages of these worms removed by fine phenothiazine in this trial were not as high as in some previous trials.

Phenothiazine seems to be variable in its effect against *Nematodirus*. Though a highly significant result has been obtained in this trial, earlier work has not given similar results.

The figures for the hookworm (*Bunostomum*) and the large bowel parasites (*Trichuris*, *Oesophagostomum*, and *Chabertia*) are of doubtful value, on account of the small numbers of these worms present.

Copper methylarsenate is in no way superior to phenothiazine in removing sheep roundworms; in fact, it is only satisfactory against the large stomach worm. Though copper methylarsenate is effective against the tapeworm, this does not confer on it any great advantage, since little importance is usually attached to this parasite. In any case, should treatment for tapeworms become necessary, bluestone-nicotine is very nearly as satisfactory and is only a fraction of the cost of copper methylarsenate.

RESULTS FROM USE OF COPPER METHYLARSENATE AND PHENOTHIAZINE

		Phenothiazine	Copper methylarsenate	Control (undosed)
Stomach worms				
Haemonchus contortus (large stomach worm)	Mean worm count	55	16	352
	Percentage of worms removed	84	95	
Ostertagia circumcincta (medium stomach worm)	Mean worm count	1,530	5,640	6,630
	Percentage of worms removed	77	Not significant	
Trichostrongylus axei (small stomach worm)	Mean worm count	140	1,130	1,260
	Percentage of worms removed	89	Not significant	
Small intestinal worms				
Nematodirus (mixed infection of *N. pathigen* and *N. filicollis*)	Mean worm count	60	1,960	1,480
	Percentage of worms removed	96	Not significant	
Trichostrongylus colubriformis (black scour worm)	Mean worm count	260	6,090	4,810
	Percentage of worms removed	95	Not significant	
Cooperia	Mean worm count	20	1,960	1,350
	Percentage of worms removed	98	Not significant	
Bunostomum (sheep hookworm)	Mean worm count	0.2	1	1.5
	Percentage of worms removed	82	Not significant	
Large intestinal worms				
Trichuris (whipworm)	Mean worm count	12	3	13
	Percentage of worms removed	Not significant	77	
Oesophagostomum	Mean worm count	5.5	2	8
	Percentage of worms removed	Not significant	70	
Chabertia	Mean worm count	3	5	17
	Percentage of worms removed	82	76	

Toxicity of Copper Methylarsenate to Sheep

DURING the late summer and autumn of 1957 several mortalities in lambs were reported after the use of copper methylarsenate tablets for the control of worms. In some cases losses were as high as 10 per cent. of lambs dosed. This compound is guaranteed as being completely non-poisonous to sheep, but experience in the field and laboratory trials do not support such a claim.

DEATHS usually occurred within 14 days of dosing. Affected lambs showed loss of condition, scouring, and

in some cases jaundice and redwater. In some lambs the copper levels of the liver were within the copper poisoning range and in one field case arsenic analysis of the liver was high enough to support a diagnosis of arsenical poisoning. The most constant finding on post-mortem examination was evidence of quite severe kidney damage and this was also supported by blood non-protein nitrogen determinations, which rose to extremely high levels.

Dosing Trials

Following reports of mortalities in the field dosing trials were carried out at Wallaceville to determine the following points:—

1. If copper methylarsenate was toxic for lambs.
2. The effect of a normal dose on lambs under varying conditions.

The first trial involved the use of five lambs in the 30lb. to 40lb. bodyweight range and they were given 1, 2, 3, 4, and 5 tablets respectively. Of these only those receiving 3 and 5 tablets died at the third and fifth days and the remaining lambs survived. As the normal dose for lambs of this weight would have been 1 tablet only, this trial indicated that there was a reasonable margin of safety.

In the second trial 12 lambs ranging in weight from 40lb. to 75lb. were used and all were given the recommended dose of 2 tablets each. Six of these lambs were kept away from water for 3 days before dosing while the remaining six had free access to water for the whole time. All lambs were on dry feed at the time of dosing. Of these only one lamb weighing 44½lb. which had free access to water died 9 days after dosing. The remaining 11 lambs were allowed free access to water and given a further 2 tablets of copper methylarsenate 19 days after the first dose, and one animal died 8 days after the second treatment. Under field conditions favourable to the survival of the large stomach worm it is often necessary to dose at short intervals, and this trial indicates that repeated dosing with copper methylarsenate would be risky.

In the third trial unthrifty lambs were used and all were withheld from water for 4 days before they were dosed with 2 tablets each. Two lambs died at 7 days after dosing, one at 10 days, one at 14 days, and the remaining two were extremely poor when killed at 19 days.

This trial showed that if stock are deprived of adequate water supplies, the use of copper methylarsenate cannot be recommended. Though the conditions imposed in the trials were rather rigid, it is possible to find such sheep in the field. Not all farms have water freely available and sheep may become dehydrated rapidly by scouring.

Damage to Kidneys

Analytical work carried out on the experimental lambs indicated that the arsenic was rapidly excreted by the kidneys. Any condition which prevents this rapid excretion renders the animal susceptible to kidney damage by the retained arsenic. Where the time interval between dosing and death was beyond 5 to 6 days, it was found that the liver arsenic at this time was very low, but in most cases the amount in the kidneys was relatively high.

To arrive at a diagnosis by chemical analysis in cases of suspected toxicity it is essential to get kidney in addition to liver and these should be collected from the first animals which die after dosing.

Though under normal conditions copper methylarsenate is comparatively safe, field and experimental results show that when used under certain conditions it is poisonous for lambs. The mode of action of the compound is different from a simple arsenic poisoning caused by inorganic arsenic. The main damage caused by its action is located in the kidneys and under certain conditions which occur in the field the margin of safety is far too slender for it to be recommended for general use.

—R. M. SALISBURY, Chief Diagnostic Officer, and E. L. J. STAPLES, Technical Officer, Department of Agriculture Animal Research Station, Wallaceville

Agricultural and Pastoral Show Dates

THE following are dates and venues of A. and P. shows up to the end of April:—

NORTH ISLAND

January

1 January—Nuhaka A. and P. at Nuhaka.
17 and 18 January—Feilding I., A., and P. at Feilding.
*17 and 18 January—Wairoa County A. and P. at Wairoa.
24 and 25 January—Horowhenua A. and P. at Levin.
25 January—Central Hawke's Bay A. and P. at Waipukurau.
*25 January—North Kaipara A. and P. at Paparoa.
29 January—Marton District A. and P. at Marton.
*31 January and 1 February—Rodney A. and P. at Warkworth.

February

1 February—Otorohanga A. and P. at Otorohanga.
1 February—Rangitikei A. and P. at Taihape.
6 February—Matamata A. and P. at Matamata.
7 and 8 February—Taranaki A. and P. at New Plymouth.
*7 and 8 February—Taumarunui and District A. and P. at Taumarunui.
8 February—Hukerenui A. and P. at Hukerenui.
8 February—Woodville A. and P. at Woodville.
11 and 12 February—Dannevirke District A. and P. at Dannevirke.
12 February—Te Awamutu A. and P. at Te Awamutu.
14 and 15 February—Franklin A. and P. at Pukekohe.
*14 and 15 February—Ohura A., P., H., and I. at Niho Niho.
15 February—Waiapu P. and I. at Ruatoria.
15 February—Pahiatua A. and P. at Pahiatua.
15 February—Northern Wairoa A. and P. at Mititai.
15 February—Opotiki A. and P. at Opotiki.
21 and 22 February—Masterton A. and P. at Masterton.
*21 and 22 February—Te Kuiti and District A. and P. at Te Kuiti.
22 February—Putaruru A. and P. at Putaruru.
22 February—Whakatane A. and P. at Whakatane.
26 February—Morrinsville A. and P. at Morrinsville.
*28 February and 1 March—Wellington and Hutt Valley A. and P. at Trentham.

March

1 March—Waiotira Junction A. and P. at Waiotira.
1 March—Mangonui County A. and P. at Kaitaia.
1 March—Albany A. and P. at Albany.
1 March—Te Puke A. and P. at Te Puke.
8 March—Kumeu A. and P. at Kumeu.
8 March—Tauranga A. and P. at Tauranga.
*15 March—Wellsford A. and P. at Wellsford.
15 March—Hawke's Bay A. and P. at Hastings.
22 March—Poverty Bay Autumn Carnival at Gisborne.

SOUTH ISLAND

January

11 January—Blueskin A. and P. at Waitati.
18 January—Waikouaiti A. and P. at Waikouaiti.
25 January—Waiau A. and P. at Tuatapere.
*25 January—Golden Bay A. and P. at Takaka.
26 January—Peninsula Horse Show and A. and P. at Duvauchelle, Banks Peninsula.
28 and 29 January—Otago A. and P. at Dunedin.

February

1 February—Banks Peninsula A. and P. at Little River.
8 February—Palmerston and Waihemo A. and P. at Palmerston.
15 February—Murchison A. and P. at Murchison.
15 February—Inangahua A. and P. and Sports at Reefton.
22 February—Maniototo A. and P. at Ranfurly.
*22 February—Kaikoura A. and P. at Kaikoura.

March

*1 March—Temuka and Geraldine A. and P. at Winchester.
8 March—Cheviot A. and P. at Cheviot.
*8 March—Mount Benger A. and P. at Roxburgh.
15 March—Hawarden A. and P. at Hawarden.
*15 March—Upper Clutha A. and P. at Wanaka.
22 March—Mayfield A. and P. at Mayfield.
*29 March—Methven A. and P. at Methven.

April

7 April—Strath Taieri A. and P. at Middlemarch.
7 April—Mackenzie County Highland Show at Fairlie.
12 April—Oxford A. and P. at Oxford.
*19 April—Malvern A. and P. at Sheffield.

* The Department of Agriculture exhibit will be staged at this show.

Caterpillar Damage to Commercial Potato Crops

By C. J. HAMBLYN,
Fields Superintendent,
Department of Agriculture,
Palmerston North

POTATO growers in the Rangitikei, Manawatu-Horowhenua, and Central Hawke's Bay districts, where some 3000 to 4000 acres of potatoes are grown each year to supply the North Island market from November to April, have suffered some heavy losses in recent years due to damage done to tubers both in the ground and after harvest by caterpillars of a night-flying moth. The damage has been done by the common potato tuber moth (*Gnorimoschema operculella*), which is widespread in these districts and, because of favourable conditions for multiplication and lack of adequate control measures, has definitely shown a marked increase in the past few years to the stage that it is now a serious menace to the potato crop.

[*Green and Hahn*
Potatoes infested with caterpillars of the potato tuber moth.

LOSSES from damage to tubers have averaged from 1½ to 2 tons per acre in some areas. In individual crops the loss has risen to over 50 per cent. of the crop.

Identification Essential

A first essential in taking active steps to control this insect is to be able to recognise the insect itself, both the moth and the caterpillar, and to know the type of damage it does to the tubers and to distinguish it from the much less severe damage done by either slugs or wireworms.

It is also necessary to know something of the life history of the insect and the way in which it gets at the potatoes to damage them. That it can be controlled and the damage reduced to practically nothing has been demonstrated by potato growers, but the control measures must be taken at the right time if the type of damage experienced this year, when many growers lost upward of £50 worth of tubers per acre, is not to be repeated.

The potato tuber moth is a small, brownish grey, night-flying moth with a wing span of about ½in. and a frilly appearance to the back of the wings. When disturbed by anyone walking through the potato crop in the day time the moth is easily recognised by its erratic, short flight up into the air and darting down to seek cover in the crop.

Control of Potato Tuber Moth

The first moths appear in the crop in early November, laying eggs on the foliage, where the caterpillars hatch out in warm weather in a few days and immediately eat their way into the stems, down which they bore until reaching maturity. In hot, dry weather these caterpillars after a short pupation emerge as adult moths and egg laying, hatching, and growth of the caterpillars inside the stems are repeated, so that if control measures are not taken, a big population of moths can be built up in favourable seasons by the time the tubers reach maturity and the tops die down. It is then that the moths have to seek the tubers in which to lay their eggs.

Any tubers exposed by growing out of the ground or through the drying out and opening up of the ridges, leaving holes or cracks the moths can crawl down, are used for this purpose. The eggs soon hatch, being laid usually round the potato eyes, and the grubs eat into the tubers, where they make their characteristic tunnels filled with trash on which grows a black fungus. If the potatoes thus attacked are left too long in the ground, the caterpillars pupate and new batches of moths emerge to continue the attack on more potatoes.

Though it is usual to discard potatoes obviously damaged by the caterpillars, it is not possible to eliminate those with newly laid eggs on them or those in which the caterpillars have just started operations. When such potatoes are put into storage in bags, bins, or even clamps for long the caterpillars on reaching full growth pupate and soon change to adult moths, which on emerging continue to lay eggs in sound tubers. The process can go on as long as the weather is warm until most of the potatoes are ruined. As most of the crops in the districts affected are dug for immediate sale, the growers do not suffer further loss after discarding the obviously damaged tubers, but the buyer who holds the potatoes for even a few weeks can suffer a considerable storage loss due to the activity of the tuber moth.

In the paddock the caterpillars generally pupate on the surface under trash and clods, but among potatoes in storage they pupate on the inside of containers, and sacks which have held affected potatoes are found with pupa cases adhering to them. They should be soaked in boiling water to kill the insects.

There are two main methods of control of the potato tuber moth which can be used separately or together as conditions warrant.

Control by Moulding

Many experienced potato growers, particularly those on light soils, have shown that by careful moulding of the crop so that there is a deep, uniform covering of soil over the tubers right up to the time of digging, damage by the potato moth can be kept down to an insignificant amount; this is effective even when because of hot, dry weather the soil dries out badly and other growers who have been careless with the moulding suffer heavy losses.

Successful control of the potato moth results in few affected potatoes being left on the ground after picking up to reinfect the potato land next season with a batch of early moths. This is not the case with the grower who does not keep control of the moth. Many damaged tubers left on the

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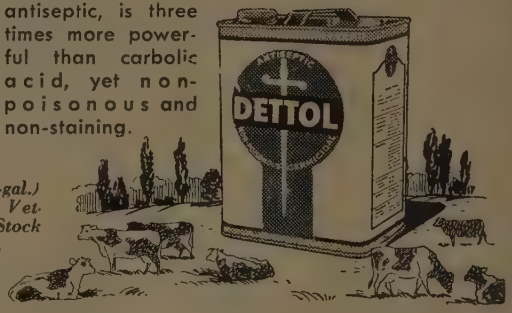

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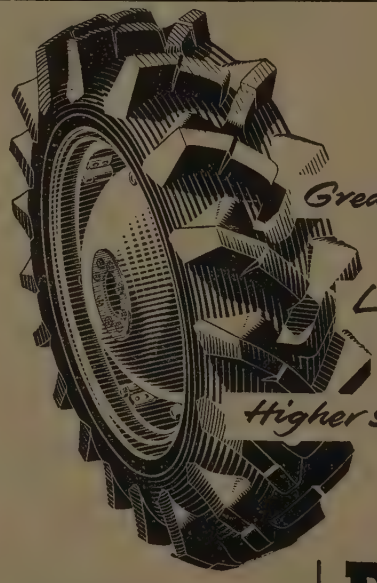

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ground provide for a heavy infestation of next year's crop right from the start, particularly if the crop is grown near last season's.

For good moulding to make ridges that will not dry out too quickly and will cover the tubers effectively with plenty of soil it is necessary to plant in not less than 30in. rows, particularly in crops intended to be harvested late in the season or held over for digging after the tops have died down. Potatoes usually develop deeper in the ground if the seed is planted deep, and in light soils the sets should be 6in. to 8in. below the surface. The ground between the rows should be cultivated several times to control weeds and to prepare the soil as deep as possible for moulding.

The first moulding should be done carefully and well and should be followed by a second moulding before the tops are too big. A third moulding should be given late crops in hot, dry seasons if the soil shows signs of opening up as the tops die off. On the heavier clayey soils moulding when the soil is too wet often results in the ridges cracking open in dry weather, leaving the potatoes exposed to the moth. On the lighter sandy and peaty soils a frequent point of access to the tubers is the sides of the ridges where the cover of soil is quite shallow.

Widely spaced rows allow for better covering at the sides. A number of growers have prevented serious damage by the tuber moth in such cases by using a special roller when the tops are drying off. The roller is 6ft. wide, covering two rows at a time, and has a diameter of 4ft. The Cambridge roller is unsatisfactory for this purpose, as its smaller diameter rolls the soil before it and does not flatten and tighten the tops as well or cover the sides of the ridges with more soil.

Control by Spraying

A number of the new insecticides can be used effectively in the control of the potato tuber moth, but it is generally useless to start using them when the tops start to die down and the potatoes are seen to have been exposed to the moths through bad moulding or after hot, dry weather over a prolonged period has caused the soil to open up. If the potato moth is prevalent in the area in which the crop is grown and experience shows that moulding with wide rows and deeply planted sets is not effective in giving protection to the tubers when the summer is unusually hot and dry, the spraying of crops for the control of the tuber moth is strongly recommended.

Spraying can be used also in conjunction with good moulding as an added precaution. As the moth first appears in the crop soon after the tops appear and several cycles from egg to caterpillar to moth can develop under favourable conditions before the tubers are likely to be exposed, it is necessary to start spraying when the tops are 6in. to 8in. high. Spraying should be repeated every 14 to 21 days until the tops are too overgrown for effective spraying.

Because for really good control it is necessary to spray the undersides of the leaves as well as the tops, ground spraying is generally more effective than aerial spraying. The sprays used can be mixed with materials used for the control of potato blight and applied at the same time.

The following are some of the materials and rates of application which have given satisfactory control of the potato tuber moth:—

1. 20 per cent. emulsion of DDT at 1¼ to 1½ pints per acre in 100 to 150 gallons of water.

2. 20 per cent. emulsion of lindane at 2 pints per acre in 100 to 150 gallons of water.

3. 15 per cent. dieldrin at 2 pints per acre in 100 to 150 gallons of water.

For aerial spraying the same materials are applied at the same rates, but the water is reduced to 10 to 20 gallons per acre, the more water giving better control.

These and other insecticides in the form of dusts or wettable powders have also been used with some success, but generally emulsions can be applied more effectively. Where potato tubers have been exposed to the moth and the caterpillars are already in the tubers nothing much can be done to stop them from feeding to maturity. Further damage by the moths which will emerge from the caterpillar pupae laying eggs in a fresh lot of tubers in storage can be prevented, however, by dusting the inside of sacks with 1 per cent. para para isomer DDT powder or dusting the tubers with the same dust at 10lb. per ton. Lindane and BHC tend to taint the tubers dusted with them, but may be used on seed tubers.

All tops and tubers of a badly affected crop should be destroyed.

Other Insect Damage

In the Rangitikei and Manawatu another caterpillar has last season taken a heavy toll of some crops, in which up to 25 per cent. of the tubers were damaged to the extent that they were unfit for market. The damage it does appears as characteristic big smooth tunnels leading into and through the tubers. Insufficient is at present known of the depredations of this caterpillar in potato crops to enable specific treatment to be recommended on a general basis. Potato growers who have suffered losses of this nature are invited to discuss their problem with the local Instructor in Agriculture with a view to ascertaining if possible some means of preventing a recurrence of the damage.

In some seasons slugs present in sufficient numbers can damage potato tubers. They eat relatively shallow, wide holes in the surfaces of the potatoes which may be deepened by other insects, such as slaters. The wireworm, the grub of the click beetle, also does some damage at times. The holes it makes are quite small compared with those of the caterpillar referred to above, the grubs being long, thin, and whitish with brown heads.

Damage by these insects, though troublesome in the home garden, is seldom of importance in the field.

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Recent Research Work

WEED CONTROL IN FIELD BRASSICAS AND ONIONS

TRIALS in the 1956-57 season have confirmed the value of using chemicals to weed field brassicas, particularly swedes and turnips, and have emphasised that onions are one of the most difficult crops to keep free of weeds.

IN FIELD BRASSICAS

THE trials show that in brassicas effective weed control depends on a number of conditions, the most important being that of establishing a good crop to obtain complete ground cover as soon as possible. The weedkillers used usually control the first crop of weeds to strike, but if the crop is slow to establish, successive crops of weeds may then compete with the crop.

Of the chemicals used, brassicas show greatest tolerance to TCA and may be used at up to 20lb. per acre without detriment to the crop. To be effective this chemical must be applied to moist soil and further rain should follow the application. It should be applied normally as soon as the crops are drilled or broadcast. If no rain follows the application, the weeds germinate and compete with the crop. If sufficient rain follows, good control is obtained for several weeks, and if the crop is vigorous, it can establish weed free in this period.

Used under optimum conditions TCA gives effective control of fat-hen, red-root, Prince of Wales feather, and willowweed, and to some extent will control spurrey. If spurrey is the dominant weed, IPC or CIPC under cool soil conditions may be used at rates of 1lb. carbamate equivalent to the acre. These chemicals should be applied as for TCA; that is, they should be applied as soon as a crop is drilled in and when rain is expected. If the seed is broadcast, the weedkillers should be applied immediately the seed is covered. It is necessary to apply the weedkillers with a minimum quantity of water. If the brassica seed is drilled into the soil, the weedkillers may be applied behind the drill as a directed spray only over the row or as a spray over the whole area behind the drill.

Another type of chemical, oktone, may be used for brassica weed control if the crops are drilled. The seed-bed should be prepared, weeds allowed to strike (1in. to 3in. high), and then the crop drilled. As soon as the crop is drilled, if the oktone is applied at 2lb. to 4lb. per acre in 10 to 15 gallons of kerosene, the weeds are killed without detriment to the crop. This chemical, unlike TCA, CIPC, and IPC, has no residual life in the soil, so that if the crop does not establish quickly, further germination of weeds may occur. Oktone should not be applied once the crop is through the ground; otherwise crop damage will occur. This treatment is independent of climatic conditions and will give a wide range of weed control. It is more suitable for rape and chou moellier, crops that form a complete ground cover.

SUMMARY

Crops of brassicas may be grown weed free. This depends on the effective use of chemicals and a quick-establishing crop. If the crop is slow to establish, successive germination of weeds may occur after the effect of the chemical has worn off. The most successful chemical is TCA. If spurrey is the dominant weed, IPC and CIPC should be used. Oktone and diesel fuel oil may be used for crops that are drilled into the soil.

IN ONIONS

Further trials in the 1956-57 season have emphasised that onions are one of the most difficult crops to keep weed free. Any crop that remains in the ground for a considerable period and does not form a complete ground cover is difficult to maintain free of weeds. The chemical required for weed control in onions is one that has long residual properties in the soil so that successive crops of weeds are destroyed.

At present no chemical is sufficiently selective to give long-term weed control without damage to the onions. Monuron (formerly CMU) persists for long periods in the soil, but rates that are selective for onions allow Scotch thistle, various flatweeds, docks, wireweed, willowweed, etc., to persist and grow at the expense of susceptible weeds that are controlled with monuron. Monuron also has the disadvantage that it can cause crop damage if heavy rain falls and leaching occurs.

CIPC is more selective than monuron, but also fails to control all weed species. Scotch thistle, sow thistle, various flatweeds, clover, etc., survive. CIPC can also cause onion damage or its herbicidal properties can be dissipated quickly under high soil temperatures. In a typical trial at Opiki the main weeds were Scotch thistle, black nightshade, buttercup, cress, and willowweed. Monuron at 2lb. per acre failed to control Scotch thistle and some willowweed which in the absence of other weeds grew larger than normal plants. CIPC failed to control Scotch thistle, to the detriment of the onion crop.

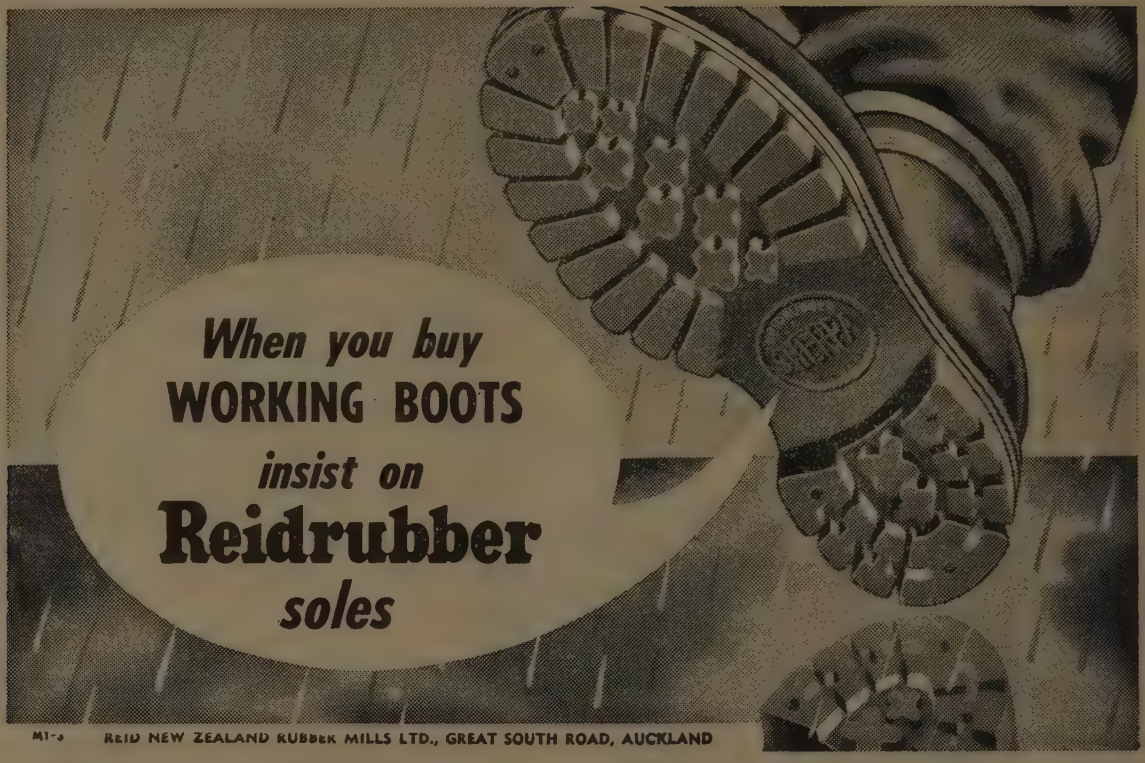
A further factor in the use of monuron and CIPC is that both these chemicals have to be applied before the weeds have struck; otherwise the weeds soon become resistant to the low rates of application that have to be used.

Contact chemicals such as oktone or sulphuric acid control a wide range of weeds, but have no residual life in the soil. If oktone or sulphuric acid is used to kill weeds which have appeared before the crop has germinated or is applied to a stale seed-bed, the onion crop germinates and establishes weed free. In the stale seed-bed method the weeds are allowed to strike before the crop is drilled into the soil. If the onions have been established weed free with the use of either oktone or sulphuric acid, CIPC may then be used as a residual weedkiller with less likelihood of damaging the onions. High rates, 4lb. to 8lb., may be used. The CIPC should always be applied before the weeds have struck. If resistant weeds are present, such as various thistles, oktone or sulphuric acid may be used. Oktone should be used as a directed spray at 2lb. to 4lb. per acre, in 10 to 15 gallons of diesel fuel oil. Used in this method oktone plus diesel fuel oil will give wide weed control. Sulphuric acid will not control plants with wax-like leaves such as portulaca.

RECOMMENDATIONS

Weedkillers will assist materially in the control of weeds in onions. The residual weedkillers probably are too toxic to be used as pre-emergence chemicals, but if the crop is established weed free with contact chemicals such as oktone or sulphuric acid, the residual chemicals can then be applied with greater safety and their effects may last several months. If resistant weeds are present, hand removal or control by contact chemicals such as directed sprays of oktone or diesel fuel oil or sulphuric acid will give adequate weed control. Unless cultivation benefits the crop, the use of correct weedkillers plus hand removal of any resistant weeds will give better weed control than cultivation alone plus hand removal of row weeds.

—B. A. J. SMITH



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Trends in

Citrus Fruit Production and Plantings

By W. A. FLETCHER,
Citriculturist,
Department of Agriculture,
Auckland

CITRUS trees were first grown in New Zealand at Kerikeri as early as 1819 and commercial crops have been produced for more than 80 years. It is estimated that in 1956 there were 152,000 citrus trees growing in commercial orchards throughout the Dominion. This article discusses production and planting trends.

LEMONS and the so-called New Zealand grapefruit are the primary commercial crops, but orange and mandarin plantings, though still small, are being expanded.

Citrus Production in 1956

Despite exceptionally wet weather from April until mid-December the 1956 season was generally favourable for the growth of citrus. The winter was mild and lemon crops were better than in the previous year. Many New Zealand grapefruit trees, however, are developing a marked biennial bearing habit through growers holding crops on the tree until late in the year to avoid low prices at the peak of the season. This was reflected in variable crops in 1956 and the trend is expected to continue. Crops of New Zealand grapefruit are expected to be smaller than usual in 1957, but prospects for other citrus are good.

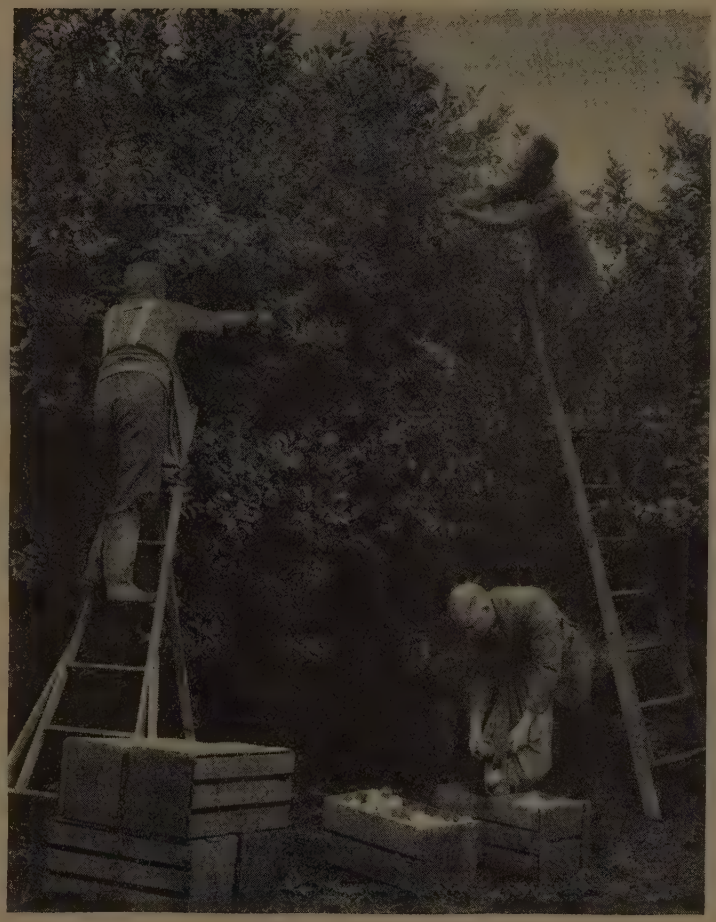
Estimated production of citrus fruits during the 1956-57 season is shown in the table below.

Planting Trends

There were 5200 new citrus trees recorded in 1956, more than 4000 of which were oranges and mandarins, planted mainly at Kerikeri and Auckland. The remaining new trees were all lemons planted in the Bay of Plenty and at Gisborne.

Removals of citrus trees amounted to 3600 trees in 1956 and, as in the past few years, consisted mainly of lemons and grapefruit. A few old, uneconomic blocks of oranges were also removed at Kerikeri, Auckland, and Gisborne.

At Kerikeri the citrus industry is making steady progress. The main interest is in planting more favourable varieties of oranges and mandarins to replace older, less-productive, and less-profitable types of citrus. Information from nurserymen in the district indicates that there were even greater increases of the desirable varieties during 1957. Standard lemons are in complete disfavour for planting in the district and eventually all existing



[*Sparrow*

All future lemon tree plantings should be of the standard varieties to ensure the highest possible level of supplies throughout the year.

ESTIMATED PRODUCTION OF CITRUS FRUITS DURING THE 1956-57 SEASON

Standard cases (about 40lb. net)

	Kerikeri	Auckland	Bay of Plenty	Gisborne	Total
Standard lemons	3,400	11,500	53,100	9,000	77,000
Meyer lemons	11,500	2,100	8,000	3,200	24,800
Total lemons	14,900	13,600	61,100	12,200	101,800
N.Z. grapefruit	17,000	62,000	37,000	2,000	118,000
Wheeny grapefruit	3,500	1,500	1,000	700	6,700
Total grapefruit	20,500	63,500	38,000	2,700	124,700
Sweet oranges	7,000	3,300	3,000	3,000	16,300
Mandarins	600	600	600	100	1,900
Other citrus	200	400	—	—	600
Total citrus	43,200	81,400	102,700	18,000	245,300

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That is the classic test of value, but it can't be applied without a knowledge of the facts. So we turn the spotlight on... *freight rates.*

The money which a shipper pays to send a consignment overseas is, in fact, a calculated proportion of the cost of operating the ship and this in turn is the total of many different items.

Some of these will be obvious to anyone who is familiar with ships. There are, to begin with, the "daily costs" of the ship's voyage, which are continuous whether she has cargo on board or not. Clearly these include the wages of the crew, the stores and provisions required to maintain them and the ship, and the cost of fuel. Also under this head are included the dues which must be paid at each port visited and each canal traversed, together with the cost of insurance against loss or damage of vessel, crew and cargo. Less obvious perhaps is a group of items which is not directly related to any particular voyage. Nevertheless, each trip must bear its proportion of these expenses, which include the cost of servicing and repairs, including dry-docking. Also under this head comes a proportion of the cost of the survey which, under British Ministry of Transport regulations, every ship must undergo every four years.

Next come the "cargo costs" which arise from the loading and discharging of cargo and the transhipment charges which must be paid at the ports of loading and discharge.

And finally there are the normal overhead expenses common to every large-scale organisation — administration expenses, office salaries, cost of maintaining shore establishments and so on.

Add these things together and you have the shipowner's outgoings; and what does it all come to, in terms of actual cash? Today, a round trip (New Zealand — London — New Zealand) costs *well over four times* as much as it did before the war; and even then the comparison is incomplete, for no account has been taken of Depreciation, a heavy charge which on a new ship today is running at a level of *about six times* as much as it did in pre-war years.

Increases of such magnitude are matters of grave concern to the shipowner, but they are not automatically passed on to the shipper. Everything possible is done to offset them, with the result that the average of freight rates today is only *just over three times* as much as it was before the war.

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blocks are expected to be replaced by other citrus varieties.

The citrus industry in the Auckland district has declined steadily over the last 3 years. Urban expansion has accounted for much of this decline, but poor net returns for lemons and grapefruit compared with those for other fruits in recent years have resulted in a complete lack of interest in replanting these citrus varieties. Mandarins have commanded good prices over the past few years, however, and there has been some expansion of the planting of these fruits.

In the Bay of Plenty there was a slight over-all increase in the area planted in citrus. New plantings were made up mainly of standard lemons, with small numbers of oranges and mandarins. These increases were offset to a considerable extent, however, by the removal of a number of standard lemon, Meyer lemon, and New Zealand grapefruit trees. Subdivision for housing is still taking place in some areas and accounts for some of the removals of trees.

Plantings of citrus are still expanding in the Gisborne district. Some Valencia orange trees have been removed and replaced with navel varieties, mainly on *Poncirus trifoliata* rootstocks. Growers are still interested in growing lemons and a number of Genoa and Villa Franca trees were planted in 1956.

Looking Ahead

Since the orchard survey carried out by the Department of Agriculture in 1953 the number of grapefruit trees has decreased slightly by about 4 per cent. This trend is likely to continue, as no plantings are being made to replace trees being removed because of old age, deterioration through neglect, or subdivision of orchards for housing sections. Nevertheless production of grapefruit is likely to increase substantially within the next few years as many young trees planted between 1948 and 1953 come into full bearing.

In 1956 there were 10,000 more sweet orange and mandarin trees in commercial orchards than in 1953, an increase of nearly 30 per cent. However, many of the new orange and mandarin trees have been interplanted in old Valencia orange blocks, especially at Kerikeri, and once the young trees are in bearing the older, less-favoured trees will be removed. Present production of these fruits is likely to be doubled within the next 5 to 10 years.

TRENDS IN CITRUS FRUIT PLANTINGS

Plantings of oranges, though still small, are being expanded.

Considerable concern is being expressed by citrus growers for the future of the lemon industry in New Zealand.

As the result of an orchard survey in citrus districts made by the Department of Agriculture in 1949 it was predicted that lemon production would fall to about 85,000 loose bushels (all grades) within 10 years. Already production has fallen lower than this—to about 75,000 loose bushels. This position has been due to much greater decreases in production from Auckland and Kerikeri than were expected, caused by lower average production per bearing tree rather than a reduction in numbers of bearing trees.

It would appear that Auckland and Kerikeri growers generally have been neglecting their trees in favour of other crops. Sub-tropical fruits, oranges, and mandarins are preferred at Kerikeri and pip and stone fruits and market gardening in Auckland.

Another estimate based on the 1949 survey was that Meyer lemon production would increase to about 35,000 cases per year. So far it has reached about 25,000 cases per year.

Using figures from the 1953 orchard survey it is possible to revise previous predictions for the industry. To obtain a true picture of the state of the industry, however, a study of the position in each of the four main districts is necessary.

Kerikeri

At present there are 1900 bearing (11 years old and over) standard lemon trees in the Kerikeri district. They produce only about 3500 loose bushels of fruit per year. Over 20 per cent. of the bearing trees are poor and there is a low average production of about 1.8 loose bushels per bearing tree.

It is expected that in 5 years the number of full-bearing trees will increase to 2400, but the condition of these trees generally is unlikely to be any better than at present.

Total standard lemon production, based on the present average production per tree, may increase in 5 years to not more than 4000 loose bushels.

Since the 1953 survey, however, there has been little interest in planting standard lemons; only 70 new lemon trees have been recorded. If

CITRUS TREES PLANTED DURING 1956

	Kerikeri	Auckland	Bay of Plenty	Gisborne	Total
Standard lemons ..	—	—	680	310	990
Meyer lemons ..	—	—	—	100	100
N.Z. grapefruit ..	—	—	—	—	—
Wheeny grapefruit	—	—	—	—	—
Sweet oranges ..	1,730	30	90	310	2,160
Mandarins	670	1,040	200	80	1,990
Totals	2,400	1,070	970	800	5,240

CITRUS TREES REMOVED DURING 1956

	Kerikeri	Auckland	Bay of Plenty	Gisborne	Total
Standard lemons ..	50	900	330	50	1,330
Meyer lemons ..	—	—	320	—	320
N.Z. grapefruit ..	—	1,020	140	20	1,180
Wheeny grapefruit ..	—	170	—	—	170
Sweet oranges ..	260	140	—	200	600
Mandarins	—	—	—	—	—
Totals	310	2,230	790	270	3,600

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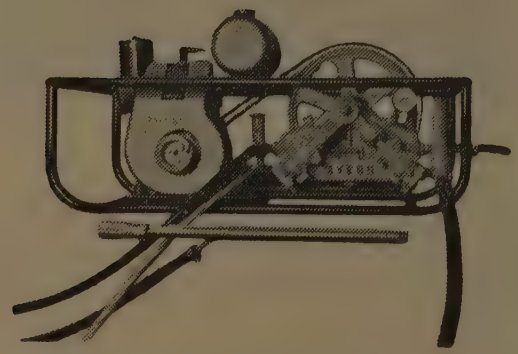

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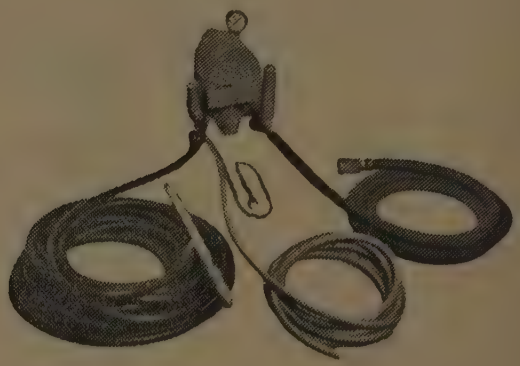

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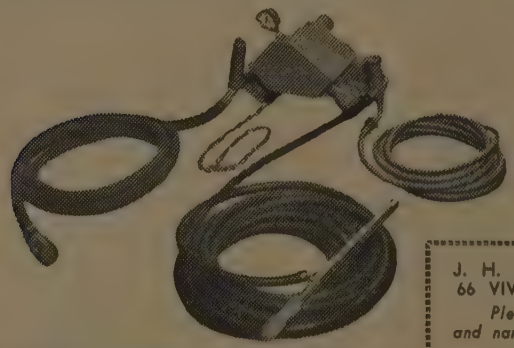

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this trend continues, which is likely, standard lemon production will decline during the next decade to almost negligible proportions in this district.

The position with Meyer lemons is a little different. In 1953 there were 5900 trees recorded at Kerikeri, virtually all of which were in good condition. Within the next 5 years all these trees will be full bearing. Though some trees have already been removed, by 1962 there should be about 5000 trees bearing an average of 3 cases per tree. Production in the district could increase from the present 11,000 cases to 15,000 cases.

As many of the Meyer trees at Kerikeri are interplants, it is possible that 5 or 6 years from now some of the trees may be removed. However, production will probably not decline very much for at least 5 years after that.

Auckland

There are 7700 bearing standard lemon trees in the Auckland district, at present producing about 11,000 loose bushels of fruit per year. At least 20 per cent. of these trees are poor and neglected and average production per tree for the district is only 1.5 loose bushels.

In 5 years the total of bearing standard lemon trees should decrease only slightly to about 7300 and production should remain at about 11,000 loose bushels per year. It might increase a little, as the orchards remaining in 5 years are likely to be the better-managed ones.

Since the 1953 orchard survey, however, only 70 new lemon trees have been recorded, and it is not likely that many further trees will be planted. A serious decline in standard lemon production in this district can be expected from about 1962 onward.

In 1953 there were 2300 Meyer lemon trees recorded, half of which were non-bearing. Within 5 years all these trees will be in bearing and production could rise from its present level of about 2000 cases to 5000 or 6000 cases.

Bay of Plenty

In the Bay of Plenty there are at present about 10,000 bearing standard lemon trees, producing a little more than 50,000 loose bushels of fruit per year. Only about 13 per cent. of these are poor trees and average production for the district is good at about 5 loose bushels per tree.

Within 5 years the number of bearing trees is expected to increase to about 13,800, which should be capable of producing between 60,000 and 70,000 loose bushels of fruit. 20,000 to 25,000 cases of which should come from Te Puke.

Since 1953 almost 1300 new standard lemon trees have been planted, an average rate of about 430 trees per year. To maintain production at 60,000 to 70,000 bushels, however, would require planting at about 560 trees a year to replace trees likely to be lost from old age. Therefore, unless the planting situation improves, production is likely to reach a peak of about 70,000 loose bushels in about 5 years and then decline slowly again over the next decade.

Meyer lemon trees totalled 5300 in 1953, about 75 per cent. of these being non-bearing. Within the next 5 years all these trees will be bearing and production could increase from 8000 cases to 15,000 cases per year.

Gisborne

The Gisborne district has 1200 bearing standard lemon trees, at present producing about 7200 loose bushels per year. There are very few poor trees in this district and average production per bearing tree for the district is 6 loose bushels.

Within 5 years the number of bearing trees is expected to increase to 3800 and production could increase to about 20,000 loose bushels.

Since 1953 about 700 trees have been planted—about 230 trees per year—whereas a planting rate of only 70 trees per year would be necessary to maintain production at 20,000 cases per season. In Gisborne, therefore, production of standard lemons can be expected to continue to increase over the next 10 years.

There were 1900 Meyer lemon trees in Gisborne in 1953 and these will all be bearing by about 1962. Production could therefore increase from its present level of about 3000 cases to 5000 to 6000 cases within 5 years.

Dominion Picture

At present about 75,000 loose bushels of standard lemons and about 25,000 loose bushels of Meyer lemons are produced annually, giving a Dominion total of about 100,000 loose bushels.

Imports of lemons have varied somewhat according to fluctuations in local production, but in the last 3 years have averaged the equivalent of about 14,000 loose bushels per year, so that the present market absorption level appears to be about 114,000 loose bushels annually.

In 5 years the population of New Zealand will probably increase by about 10 per cent. and this may be reflected in a similar increase in demand for lemons. In this case a supply of 120,000 to 125,000 loose bushels of lemons should be sufficient to satisfy market demand by about 1962.

As a result of the orchard survey in 1949 it was predicted that the market absorption level would increase to about 156,000 loose bushels by 1959. Despite an increasing population, however, this result has not been realised and this is undoubtedly due in large part to extensive planting since the war of Meyer lemon trees in home gardens, especially in cooler districts where previously it was not possible to grow lemons successfully.

Summing up it seems that annual Dominion production could increase to 100,000 loose bushels of standard lemons and about 40,000 loose bushels of Meyer lemons within the next 5 years. However, many Meyer lemon trees, possibly half of them, are interplanted with other citrus trees and therefore have a limited life, so that a production of 40,000 loose bushels of this variety may not be reached. Even if production remains no greater than at present—at about 25,000 cases—a total of about 125,000 loose bushels of all lemons should still be available in 1962 and would theoretically be sufficient to satisfy demand.

The seasonal bearing habit of the Meyer, however, will still cause irregularity in supplies of fruit at that time. Summer shortages and winter gluts will continue, necessitating imports in the off-season and export or by-products outlets and cool storage for winter crop surpluses.

More Standard Lemons Needed

Since 1953 there has been a marked falling off in the rate of planting lemon trees which will replace those being lost from old age. The yearly average number of new lemon trees recorded since 1953 is only about 700, whereas at least 1800 new trees will be necessary each year to maintain production at the level of about 125,000 loose bushels of all lemons expected within the next 5 years.

All future lemon tree plantings should be of the standard varieties to ensure the highest possible level of supplies throughout the year. Unless the planting situation improves, production of all lemons is likely to reach a peak of about 125,000 loose bushels by about 1962 and then decline again over the next 10 years.

Generally standard lemon production at Kerikeri or Auckland does not appear economic and it would probably be wise to encourage future development of the lemon industry in the more favourable districts of the Bay of Plenty and Gisborne, especially the former district. The cooler winters at Gisborne often detrimentally affect blossoms and young fruits growing at that time, which normally would develop into a summer crop. Heavy summer cropping of lemons is most desirable to alleviate marketing problems of glut and shortage.

If lemon production were concentrated in one or two districts, packing houses and processing facilities could be used much more efficiently.

By ELEANOR COUSTON,
Home Science Extension Officer,
Department of Agriculture,
Christchurch

Cosmetic Hold-all

A WELCOME gift for Christmas, a birthday, or a traveller or bride-to-be, a quilted cosmetic hold-all is simple to make and reasonable in cost. Two can be made from 2/3yd. of 36in. material, but if 27in. or 30in. material is used, the same amount will be required for one. A suitable choice is glazed chintz, good-quality sateen, or a firm, polished cotton similar to that in the illustration.

OTHER materials required are plastic or waterproofed cotton for lining, dressmaker's padding, butter muslin, slide fastener (9½in.), and cardboard (10in. x 4in.).

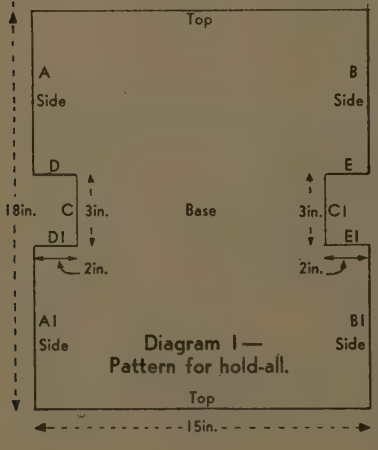


Diagram 1—
Pattern for hold-all.

The pattern: Cut out a paper pattern (Diagram 1), 18in. x 15in., with sections 3in. x 2in. removed from the centre of each of the longer sides. This allows for ½in. seam at the sides and round the cut-out sections, and ¾in. for the turn-in and hem on each top piece. Mark in the lettering as shown in the diagram.

Cutting the material: Cut or tear a rectangular piece of the outer material 19in. x 16in. This is larger than the pattern to allow for a decrease in size due to quilting. Do not cut out the side sections until the material has been quilted.

Cut the dressmaker's padding ½in. less all round than the outer material; that is, 18in. x 15in. The seams will then be less bulky when the bag is stitched together. Strip off the top layer of padding so that the piece to be used is about a half to a third of the original thickness.

Cut a rectangular piece of butter muslin the same size as the outer material.

Quilting: Mark in the guiding lines for quilting on the right side of the covering material with tailor's chalk or lightly in pencil. To do this determine the true bias of the material and draw a line as shown in Diagram 2. If the machine has a quilting foot with a guide, one line only need be marked. If it has not, lines parallel to the first one should be marked off 1½in. apart. To complete the pattern mark in the transverse lines, starting from the opposite corner of the material.

Lay the outer covering material face downward on a table. Place the dressmaker's padding over this, ½in. seam allowance being left all round. Then place the butter muslin on top of the padding. Pin into place and baste all three thicknesses firmly together. Turn to the right side and quilt, the guiding lines previously marked on the covering material being followed.

The next step: When the quilting is completed the paper pattern should be placed on top and the work cut out to the size of the pattern, the side sections being removed at the same time. Cut the lining material from the pattern also.

To make the handles cut two strips of material each 14in. x 2in. Turn in ½in. on one side of each strip and fold so that the stitching will run through the centre of the handles. If a strip of dressmaker's padding is placed inside the handles, they will be firmer.

Making up: Follow the lettering on the pattern. Cut a piece of medium-weight cardboard 10in. x 4in. and stitch this in place along the base of the bag with the 4in. ends toward the cut-out side sections, but leaving the ½in. seam allowance clear.

Stitch sides A and A1 together. Stitch sides B and B1 together. Press seams open.

Sew the handles on to the outside of the bag about 4½in. from the sides and 2½in. from the top.

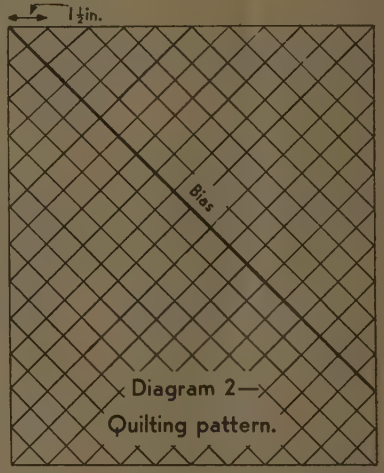
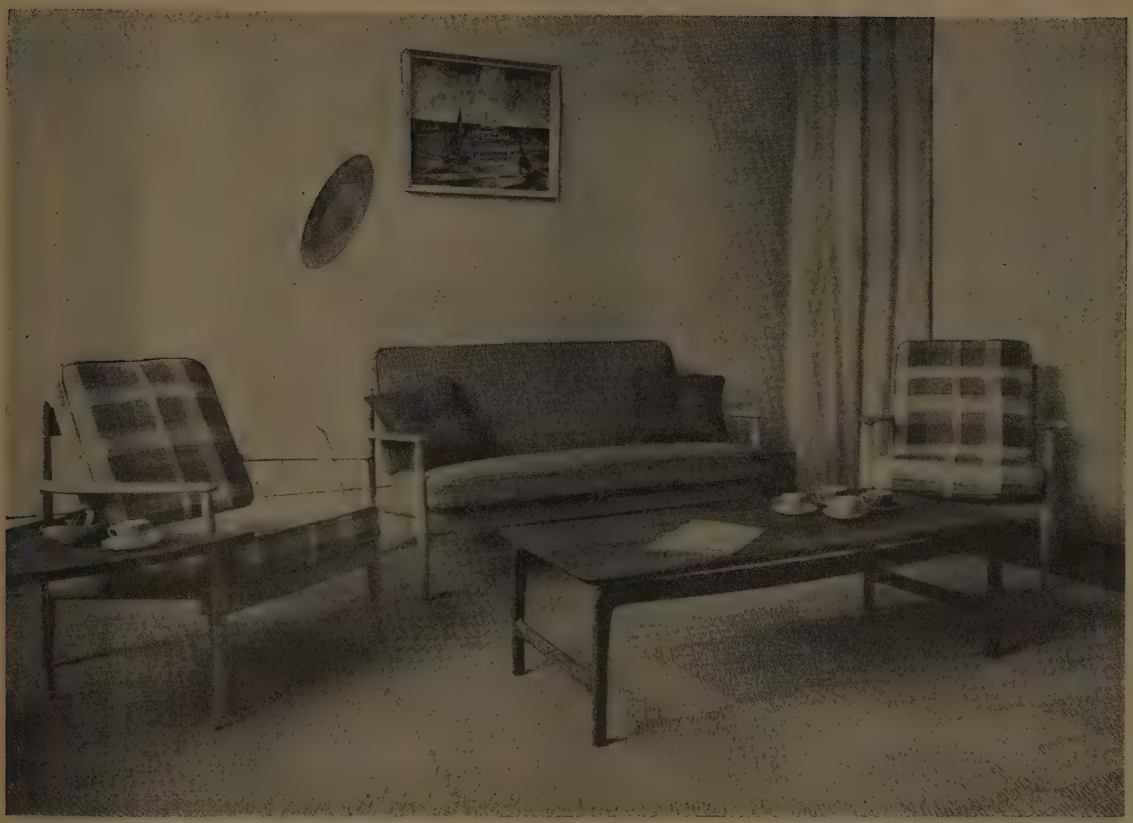


Diagram 2—
Quilting pattern.

To make the squared ends of the bag fold the corners and stitch D, D1 to C and E, E1 to C1.

Turn in the hem all round the top of the bag, using the ¾in. hem allowance. Make up the lining in the same way and place inside the bag. Use paper clips instead of pins to hold in position.

Place the slide fastener in the centre, leaving the ends of the bag open. Stitch cover, lining, and slide fastener into position. At both ends of the slide fastener stitch the covering material with a few firm stitches; then tuck the open ends of the bag in underneath.



Foam Rubber in the Home

By MAUD B. STRAIN,
Home Science Extension Officer, Department of Agriculture, Dunedin

A COMPARATIVE newcomer to the upholstery field, foam rubber is rapidly outpacing the traditional paddings and fillings such as kapok, flock, horsehair, and feathers formerly used for the purpose. Foam rubber gives a trim, sleek look well fitted to modern room settings and is, barring accidents, virtually indestructible. Like everything else it has its enemies; it is damaged by intense heat, strong sunlight, and grease and oil. But these are open adversaries, easily seen and guarded against, whereas the ruthless and voracious moths and carpet beetles which work in the dark and in secret have no effect on rubber.

FOAM rubber is a soft, resilient material made by whipping latex, the milk-like juice of the rubber tree, to a frothy foam and then moulding it into sheets which can be cut into shapes as desired or into permanent form. The foam sets into a honeycomb of minute interconnecting air cells held together and supported by latex.

There are two types of foam rubber. One is cavity sheet, which is made up to about 4½in. thick and which is used for mattresses, car seats, seats and backs of chairs, and where deep upholstery is required. The other is plain sheet, available from ½in. up to 1½in. thick and has a variety of uses. In upholstery it is used for arm rests, occasionally on chair backs, and also as stiffening strips to edge cavity strips where required.

Foam Rubber and Sponge Rubber

The terms foam rubber and sponge rubber are often used synonymously, but they refer to two different products. Foam rubber is made by whipping pure latex to a froth and baking it. It is made up of a honeycomb of interconnecting air cells which are open to the outside air and which in use are continually expelling and drawing in air as pressure is applied or released. Because of this action good ventilation is assured. It also explains why, if foam rubber is on a solid base of either wood or metal, ventilation holes are necessary in the base.

HEADING PHOTOGRAPH: Suite of modern furniture with foam rubber seats and backs.

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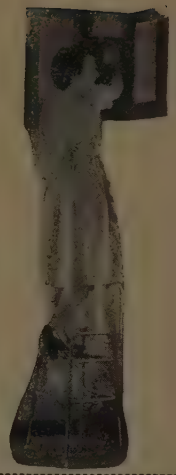

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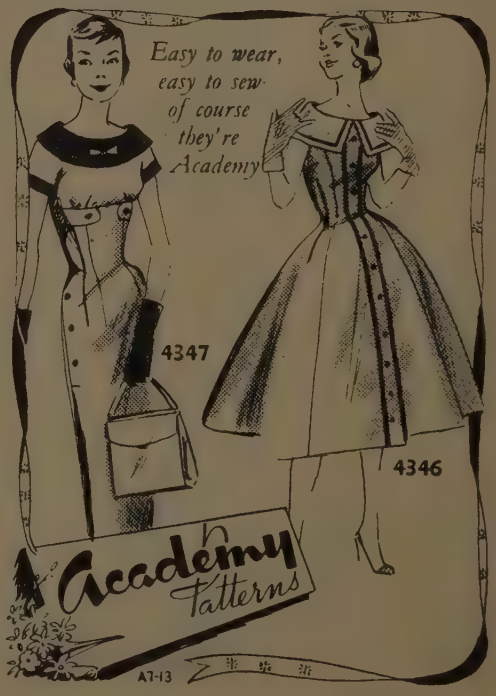


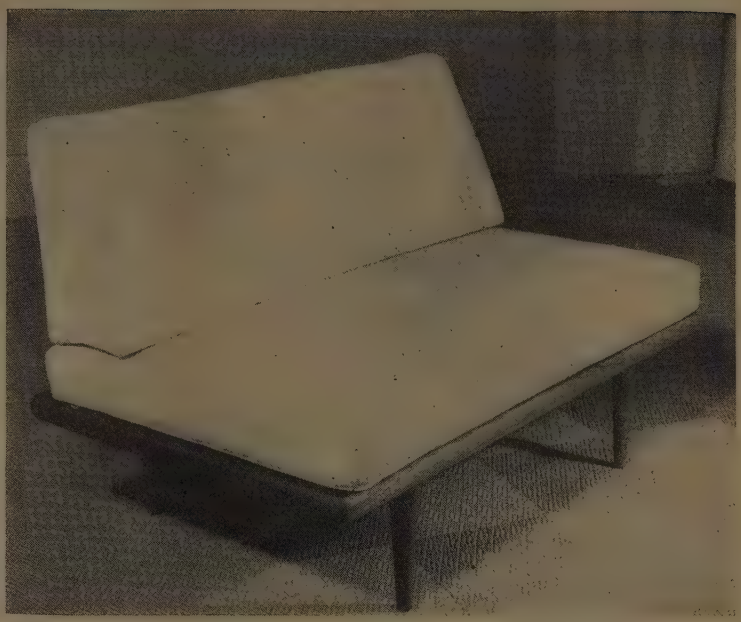
Sponge rubber is made differently; substances are added to the latex which make it "rise". (This is similar to the action of baking powder in a cake mixture.) The whole is more or less filled with bubbles of gas. These bubbles are totally enclosed and do not communicate with each other or with the outside air. The more gas that is produced the greater will be the proportion of gas to rubber and the softer will be the resulting sponge. The required firmness of the product can be adjusted by the amount of raising agent used.

In foam rubber the length of time of beating regulates the firmness of the product; the longer it is beaten the greater is the proportion of air to rubber and the softer it will be.

Latex Chips

Whipped-up rubber latex is poured into a mould and baked. The process is somewhat analagous to the making and baking of a sponge cake, and so is the result. It happens sometimes that a sponge cake is not a success, the middle part not being cooked properly. So it is with foam rubber.

When this happens the unsuccessful centre part is chopped into small pieces known as latex chips. These are used in cushions and cot pillows and for other fillings. They are resilient and soft, but, unlike cushions of foam rubber, have no stability of shape beyond that given by the enclosing cover.



The sharply defined corners and straight lines of these foam rubber cushions make them ideal subjects for loose covers.

Latex rubber chips make a soft, clean, and springy filling for pillows and cushions. They are less expensive than a comparable quantity of sheet foam rubber.

Comfort and Durability

If foam rubber is given proper care, it should last indefinitely. It is pure rubber which is extremely long lasting. It offers no feeling of resistance to weight. Pressure is equalised at every point of contact and there is no "pull" to where the weight is greatest; in other words it conforms to the body contours.

It is not inflated, there are no springs to break down and give trouble, it it cannot sag, become matted or lumpy, and never requires remaking, it does not form dust or fluff, and it is proof against vermin, moths, carpet beetles, damp, and mould. Being porous it "breathes" through its innumerable air cells and use automatically keeps it always aired.

Foam rubber pillows are especially recommended for sufferers from hay fever, asthma, and all dust and feather allergies, because they do not create dust. There are those who find foam pillows not sufficiently compressible, but some pillows are softer and less springy than others and a little time spent searching for the right pillow is well worth the effort.

Another advantage is its use in the sick room. It is the most sanitary cushioning material available as well as being comfortable, durable, hygienic, dust free, and moth resistant.

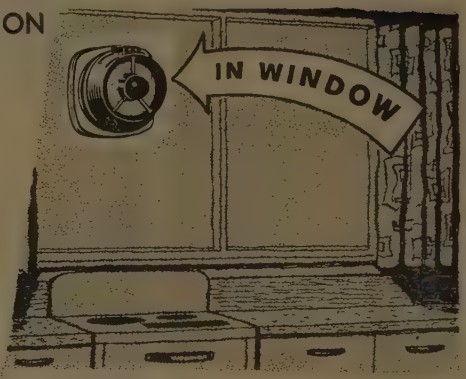
Beside its use for mattresses, pillows, cushions, and upholstery, it also forms an ideal underlay for carpets and stair treads, and insoles for shoes, shoulder pads, kneeling pads, and toys and other modern applications.

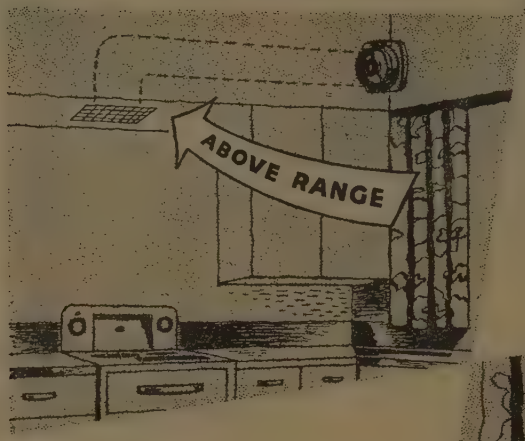
Because of its inherent durability it is the most economical cushioning for upholstered furniture, especially since it retains its shape and resiliency throughout its life. Furniture fitted with foam rubber always looks shapely and inviting, and when covering fabrics have to be renewed the clearly defined contours of the foam rubber make re-covering comparatively simple.

In sheet form and bonded on to some fabric such as hessian, foam rubber provides a highly resilient underlay for carpets and rugs. It lifts the carpet from the floor, protecting it from wear and giving it longer life. The initial expense is high, but it should be regarded as a lifetime investment. It can be put down without tacking even in small pieces; pieces can be joined easily with adhesive tape. It can be removed and reinstalled without difficulty and is easy to clean.

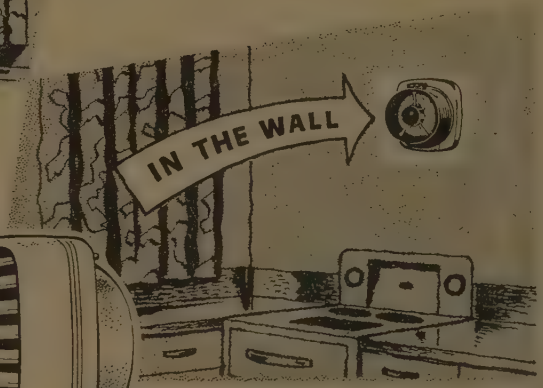
SOUND ADVICE ON SOUND VENTILATION

install an XPELAIR *fan*

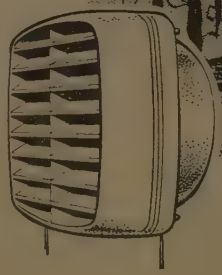




Removes cooking smells and steamy heat—preventing them from drifting into other rooms. The reduction of steam means less frequent painting. Xpelair ventilation will provide ideal air conditions in summer and winter.



Only the Xpelair fan has a built-in iris shutter which prevents back-draught when not in operation. Xpelair fans are economical, simple to install, and easily cleaned.



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Precautions in Use

That foam rubber is long lasting is proved by the fact that mattresses that have been in use constantly for 15 years still look and act as if they were new, but care must be taken to avoid the few things that are harmful to it. Strong sunlight and extreme heat both cause deterioration as do oil, grease, tar, and some dry-cleaning fluids.

In practice foam rubber in the home (except in small articles like toys and kneeling pads) is almost invariably covered. Mattresses usually have a strong cotton or cotton-rayon damask cover; upholstery such as seats, divans, and cushions are covered with some furnishing fabric; and shoulder pads and other lingerie accessories are encased in fabric.

Rubber upholstered furniture should not stand in strong sunlight for any length of time. A chair or seat intended for a sunny window either on the sunporch or in a room should not be upholstered with rubber.

Any oil, grease, or tar spots should be removed immediately with warm water and mild soap. If the spots are stubborn, a dry-cleaning fluid will have to used, but it must be used carefully, as these fluids soften rubber and vigorous action could cause permanent damage. The fluid should be wiped off immediately its work is done and the area sponged over to remove all traces of the cleaner.

Foam rubber furniture should not be very close to a radiator or to steam pipes, and if any rubber article is being stored, a dark, cool place is ideal.

Any accidental cuts or tears in mattresses or other foam rubber can be mended with rubber cement.

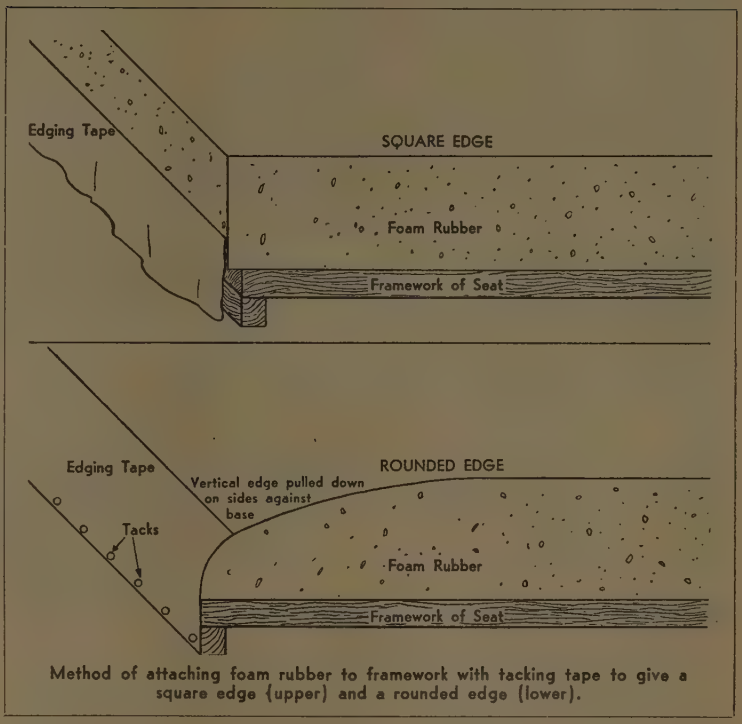
Working with Foam Rubber

The ease with which foam rubber can be used by amateurs for rejuvenating upholstered furniture makes almost any upholstery job possible. Working with foam rubber requires little more than the ability to use shears and to spread rubber cement.

A paper pattern of the shape to be cut is essential. This is placed on the foam rubber and its outline traced round with a ball-point pen. Shears dipped in water are used for cutting.

To give a good fit under compression each piece should be cut just a little bigger than the pattern. For smaller pieces about ¼in. all round is sufficient and for bigger cushions about ⅜in.; for a full-length settee 1½in. will be necessary.

Foam rubber can be used over a solid base such as wood or metal, provided there are ventilation holes through which air can escape when pressure is applied. The foam rubber is held in place with tacking strips or it may be cemented on to the base and the whole covered with a tacked-on cover.



Method of attaching foam rubber to framework with tacking tape to give a square edge (upper) and a rounded edge (lower).

In re-upholstering sprung furniture the original coil springs are readjusted and tied to keep them in position and are then covered with hessian or unbleached calico. This lessens wear on the sheet of foam rubber, which is placed on top and attached to the framework with tacking strips. A thicker foam rubber can be used similarly on top of canvas webbing.

Cementing

There need be little waste of foam rubber because offcuts can be cemented together to make a piece of the desired shape or cemented to a solid base or a tacking strip.

To join foam to foam, rubber cement is brushed over both surfaces and left about 5 minutes to dry. The surfaces are then carefully brought together. Any accidental cuts can be mended in this way.

Use of Tacking Tape

Foam rubber should never be tacked directly; tacking tape is used. Tacking tape can be made at home by applying rubber cement along one side of strips of unbleached calico, letting it dry, then cementing it to the foam rubber which has been brushed with cement and allowed to dry until it is tacky. The tape is pressed into place 1in. in from the edge of the foam and the uncemented half hangs free and can be tacked to the framework of the base.

Edging

For a square edge tacking tape is attached to the vertical edge of the foam rubber and the overhang is tacked to the base. For a rounded edge the foam rubber is cut ¾in. oversize all round. Edging tape is cemented to the top surface 1in. in from the edge. The vertical edge is tucked under, so it lies against the base, and the tape is drawn down firmly and tacked in place.

Covering

When covering foam rubber with a fabric cover it is advisable to make the cover just a shade undersize, so that when the fabric has stretched in use it will be a neat fit. Tacking strips can be cemented to the foam rubber and then stitched to the cover to prevent slipping.

If a plastic cover is being made, especially one that does not have a cloth backing, it is advisable to make an undercover of unbleached calico; otherwise the plasticiser in the cover may transfer itself to the rubber, leaving the plastic stiff and brittle.

Appetising Ways of Serving Cream Cheese

By MARY HUNT,
Home Science Extension Officer,
Department of Agriculture,
Christchurch

CREAM cheese is rich and mild in flavour and like cottage cheese is a soft, unripened cheese, though it has a considerably higher milk fat content and a lower moisture content than cottage cheese. Cream cheese is made from cream, sometimes with the addition of some whole-milk or skimmed milk, while cottage cheese is made from skimmed milk.

CREAM cheese is generally served as sandwich fillings or spread on savoury biscuits, but it can also be used in salads, cooked savoury dishes, or puddings.

Sandwich Fillings

Cream cheese can be combined with any of the following:—

Drained, crushed pineapple; chopped ginger; marmalade; finely sliced tomato; chopped raisins, dates or nuts; blue cheese; or chopped chives or parsley.

HEADING PHOTOGRAPH: Cream cheese can be used to advantage in sandwiches, salads, savoury dishes, and puddings.

Salads

Cheese balls: Form the cream cheese into balls and roll the balls in finely chopped parsley, chopped nuts, or paprika. Serve on lettuce leaves as an accompaniment to other foods.

Peach salad: Mix cream cheese with chopped nuts and a little salad dressing. Fill the cavities of canned peach halves with this mixture and sprinkle paprika on top. Serve on lettuce leaves.

Stuffed celery: Select deeply grooved celery stalks, dry them well, and cut them into about 2in. lengths. Fill the grooves with well-seasoned cream cheese and garnish with a sprinkling of paprika. Serve with salad or as cocktail snacks.

Cream cheese and pineapple salad: Mix cream cheese with chopped pineapple and serve on lettuce leaves.

Chive Cheese Omelette

1 teaspoon of chopped chives
4oz. of cream cheese
4 eggs
4 tablespoons of water
Salt and pepper

Separate the yolks from the whites of the eggs and beat the whites until stiff. Add the water, salt, pepper, chives, and cream cheese to the yolks and beat until well combined. Fold this mixture into the whites. Pour into a frying pan with a little melted butter and cook slowly until browned on the bottom. Place high up in a moderate oven to cook the top.

Pineapple Cream Cheese Pie

1 9in. uncooked pastry shell
½ cup of chopped nuts

Filling

½ cup of sugar
1 tablespoon of cornflour
8oz. of crushed pineapple

Blend the sugar with the cornflour and add the crushed pineapple. Cook, stirring constantly, until it is thick and clear. Cool.

Topping

8oz. of cream cheese
½ cup of sugar
1 teaspoon of salt
2 eggs
½ cup of milk
½ teaspoon of vanilla

Blend the cream cheese with the sugar and salt and add the eggs one at a time, stirring well after each addition. Mix in the milk and vanilla.

Spread the filling over the uncooked pie shell and pour the topping over. Sprinkle the chopped nuts over the top. Bake at 400 degrees F. for 10 minutes. Reduce the heat to 325 degrees F. and bake for 50 minutes longer. Serve cold.

Weights and Measures in Flower Garden

THE gardener must take particular care in measuring out spray materials or in measuring distances when setting out plants. In this article J. P. Salinger, Horticulturist, Department of Agriculture, Wellington, describes methods for doing this and gives tables of the commoner measurements used in the garden. The routine garden notes are by Rosalie A. Campion, Horticultural Instructor, Department of Agriculture, Wellington.

GARDENING can never be an exact science, as the weather and soil conditions may affect the results or change the gardener's plans at any time. The careful gardener tries to be accurate in all his operations, for it is only by attention to details that the best results can be obtained.

Especially when fertilisers are being used or therapeutants applied it is important to measure out the ingredients accurately, as excessive amounts may be harmful or expensive and insufficient material may be a waste of time and effort. Measuring equipment should be standardised by the gardener so that he knows exactly how much material to use and what area it will cover. An hour or two spent measuring certain areas of the garden and marking buckets or other containers for capacity will be of great benefit in the future.

Fertilisers should be measured out so that the exact quantity required for a measured area is used. Scales should be kept specifically for this.

Weighing and Measuring Fertilisers

Where large quantities of fertilisers are used these can be weighed out in a clean bucket hung on a spring balance; cheap spring balances are accurate to ½lb. only, and once the fertilisers have been weighed out they should be stored in sacks or plastic bags, not in metal containers.

Smaller quantities are more conveniently measured by volume and a table on page 624 gives the weight of fertiliser in a 1lb. jam jar and a quart preserving jar loosely filled with the common fertilisers.

Measuring Therapeutants

The dilution of spray materials, whether as solids or liquids, is usually given as a weight such as 1oz. to 4 gallons or 1½ fl. oz. to 4 gallons. Where the gardener wishes to weigh out dry spray materials he should use scales specially reserved for this purpose; household scales from the kitchen should not be used. It is more convenient, though not quite so accurate, to measure these materials with either standard-sized measuring spoons or a medicine glass. The weight of the more usual spray materials in tablespoons is given on page 624.

Occasionally quantities of spray materials are given as proportions, for instance 1 in 20, and a table on page 624 gives the weight or measure of spray materials in various proportions.

Though the British systems of measurement have been standardised, the relation of one measurement to the next may be different (for instance 12in. equals 1ft., but 3ft. equals 1yd.). On the Continent and for scientific purposes the metric system is used and the relation between one measurement and the next is in multiples of ten (for instance 10 millimetres equals 1 centimetre, 100 centimetres equals 1 metre). In many of the tables the metric measurement or a conversion table is given so that Continental or scientific measurements may be converted into the British system.

The British systems of measurement are used by Great Britain, Australia, New Zealand, the United States of America, and Canada. One important difference between the United States and British systems is in the measurement of liquids, the United States liquid measure of pints and gallons is four-fifths of the British (Imperial) measure.

The following table sets out the two systems:—

	British	U.S.
1 pint ..	20 fl. oz.	16 fl. oz.
1 gallon ..	160 fl. oz.	128 fl. oz.

This difference should be remembered when American recommendations for spray materials are followed; the given number of ounces or fluid ounces recommended for 5 gallons (U.S.) should be used in 4 gallons (Imperial). If given in pints to gallons the quantities should be the same.

Cubic Capacity of Glasshouse

Many insect pests in a glasshouse can be controlled by using insecticidal smoke generators, and it is important to know the capacity of the glasshouse in cubic feet so that the correct amount of fumigant or number of smoke generators are used. Illustrated on page 623 is the way to measure the cubic capacity of a gable roof and a leanto glasshouse.

Measuring Land

Though most measurements of length are made in inches, feet, and

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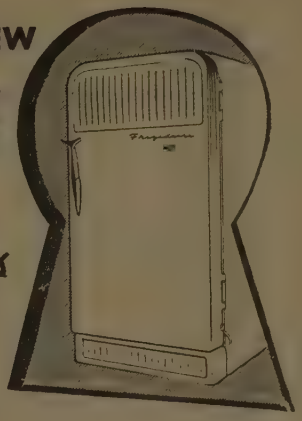

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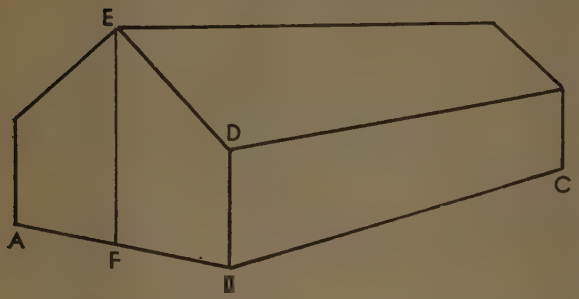
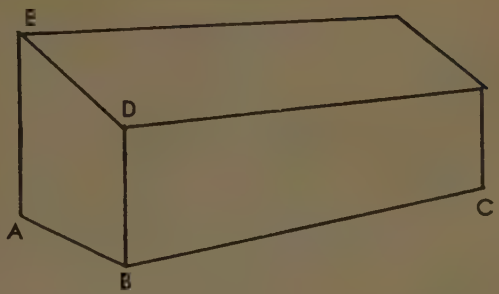
CALCULATING THE CUBIC CAPACITY OF A GLASSHOUSE



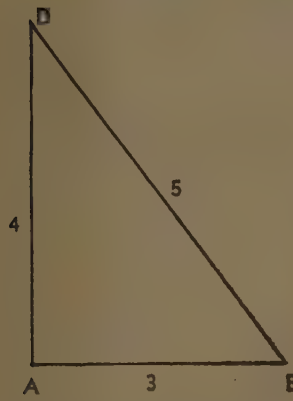
A Gable roof glasshouse: 1. Multiply width AB by length BC = square area. 2. Add height to eave BD to height to ridge EF and halve this figure = average height. 3. Multiply square area by average height = cubic capacity.



A Leanto glasshouse: 1. Multiply width AB by length BC = square area. 2. Add height to eave BD to height to ridge AE and halve this figure = average height. 3. Multiply square area by average height = cubic capacity.

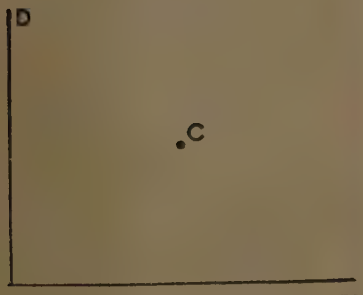
MAKING A RIGHT ANGLE

Method 1



1. Make AB 3 units long. 2. Make AD 4 units long. 3. Make BD 5 units long. BAD is a right angle.

Method 2



1. Place a stake at point C. 2. Take a line and mark off B on the base, so that AC = BC. 3. Place a stake at B. 4. Take the line with length BC toward D and sight through C to D. 5. A right angle is formed at BAD.

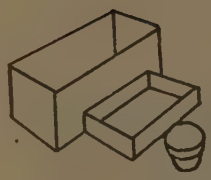
yards, surveyors use a different system when measuring areas of land. The surveyor's measure is based on links and chains and special care must be taken when a surveyor's tape is used, as this may be marked on one side in links and chains and on the other side in inches and feet. Similarly surveyors, when measuring heights (taking levels), divide feet and inches into tenths so that a height given by a surveyor as 7.25ft. equals 7ft. 3in. Details of areas of land in the two measurements are given on page 624.

Marking out a Right Angle

A right angle can be marked out, if a triangle is laid out on the ground with length of sides in the proportion 3 : 4 : 5, the right angle being at the junction of sides measuring 3 and 4.

Alternatively a right angle can be marked out without measurement by using straight stakes and a line.

Spray materials should be measured accurately, a standard measure such as a plastic spoon of a known capacity being used.



Quantities of Soil

A standard apple case holds about 1 bushel. Most soil mixtures are made up to 1 bushel.

Standard soil mixtures based on the John Innes formula are as follows:—

Parts by bulk of	Seed-sowing compost	Potting compost
Loam	2 parts	7 parts
Leafmould, peat, or compost ..	1 part	3 parts
Coarse river sand	1 part	2 parts
To each bushel add		
Superphosphate	1½oz.	1½oz.
Garden lime ..	¾oz.	¾oz.
Dried blood ..		1½oz.
Sulphate of potash		¾oz.

One bushel of soil will fill the boxes or pots of the following sizes:—

2¼ x seed boxes measuring 19in. x 13½in. x 2in. deep

40 x 5in. pots

80 x 4in. pots

1 kerosene tin holds about 4 gallons or ½ bushel

21 bushels = 1 cubic yard

Measures of Weight

British System

16oz. = 1lb.
14lb. = 1 stone
112lb. = 1cwt.
20cwt. = 1 ton
2,240lb. = 1 ton

Note: United States ton = 2,000lb. = 20 × 100lb., as the cwt. is not a standard U.S. measure.

Metric System

1,000 grams = 1 kilogram

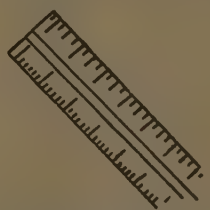
Relation of British and Metric Systems

28.4 grams	= 1oz.
454 grams	= 1lb.
1 kilogram	= 2.2lb. (= 2lb. 3oz. approx.)
0.454 kilograms	= 1lb.

Weights of Fertilisers Contained in a 1lb. Jam Jar and a Quart Preserving Jar

(The weights are for the jar loosely filled to the base of the neck)

Fertiliser	1lb. Jar	Quart preserving Jar
Blood and bone ..	8oz.	1lb. 6oz.
Superphosphate ..	10oz.	1lb. 12oz.
Sulphate of ammonia	12oz.	2lb.
Sulphate of potash ..	15oz.	2lb. 12oz.
Garden lime	15oz.	2lb. 12oz.



Measurement of Length and Area

English System

Length

12in. = 1ft.
3ft. = 1yd.
22yds. = 1 chain
1,760yds. = 1 mile
5,280ft. = 1 mile

Area

144 sq. in. = 1 sq. ft.
9 sq. ft. = 1 sq. yd.
484 sq. yds. = 1 sq. chain
4,840 sq. yds. = 1 acre
43,560 sq. ft. = 1 acre
10 sq. chains = 1 acre
640 acres = 1 sq. mile

Metric System

Length

10 millimetres = 1 centimetre
100 centimetres = 1 metre
1,000 metres = 1 kilometre

Area

1 sq. metre = 1 centiare
100 sq. metres = 1 are
10,000 sq. metres = 1 hectare

Relation between English and Metric Systems

Length

1in.	= 2.54 centimetres
1ft.	= 30.48 centimetres
1yd.	= 0.914 metres
1 mile	= 1.61 kilometres
1 centimetre	= 0.39in.
1 metre	= 39.37in.
1 kilometre	= 0.62 miles

Area

1 are	= 119.6 sq. yds.
1 hectare	= 2.471 acres

English Surveyor's Measure

Length

7.92in.	= 1 link
25 links	= 1 perch
16½ft.	= 1 perch
100 links	= 1 chain
66ft.	= 1 chain
10 chains	= 1 furlong
220yds.	= 1 furlong

Area

30¼ sq. yds.	= 1 sq. perch
40 sq. perches	= 1 rood
4 roods	= 1 acre

Weight of Dry Spray Materials in Level Tablespoons

	oz.	Tablespoons
Copper oxychloride	1	= 2
Copper sulphate	1	= 3½
Hydrated lime	1	= 4
Thiram wettable powder ..	1	= 3
Captan wettable powder ..	1	= 4
Colloidal sulphur powder ..	1	= 1½
Lead arsenate	1	= 3
Lindane wettable powder ..	1	= 4
DDT wettable powder ..	1	= 3

Note: Some manufacturers now state the quantity of spray material to use in tablespoons per gallon.

Temperature

The British system of measuring temperature is based on the Fahrenheit scale (F.). The Continental and scientific system is based on the centigrade scale (C.).

A comparison of the two scales shows the following relationship.

	Degrees F.	Degrees C.
Freezing point ..	32	0
Boiling point ..	212	100

1 degree C. = 1.8 degrees F.

(a) To convert centigrade to Fahrenheit multiply degrees C. by 1.8 and add 32. Example: 10°C. x 1.8 = 18 + 32 = 50°F. (b) To convert Fahrenheit to centigrade subtract 32 and divide by 1.8. Example: 50°F. — 32 = 18 ÷ 1.8 = 10°C.

Note: When meteorologists refer to "10 degrees of frost" the actual temperature Fahrenheit is 22°F., not —10°F.

Measures of Liquid

British (Imperial) System

2 teaspoons	= 1 dessertspoon
2 dessertspoons	= 1 tablespoon (tab.)
2 tablespoons	= 1 fl. oz.
20 fl. oz.	= 1 pint
2 pints	= 1 quart
4 quarts	= 1 gallon
160 fl. oz.	= 1 gallon

U.S.

16 fl. oz. = 1 pint
8 pints = 1 gallon
128 fl. oz. = 1 gallon

Metric System

1 cub. centimetre (c.c.) = 1 millilitre (m.l.)
1,000 c.cs. or 1,000 m.ls. = 1 litre

Relation of British and Metric Systems

28.4 c.cs. or m.ls.	= 1 fl. oz.
4.54 litres	= 1 gallon
1.75 pints	= 1 litre

Proportions of Liquids: Fluid Ounces per Gallon

1 : 16 = 10 fl. oz. per gallon
1 : 20 = 8 fl. oz. per gallon
1 : 25 = 6½ fl. oz. per gallon
1 : 40 = 4 fl. oz. per gallon
1 : 100 = 1½ fl. oz. per gallon
1 : 800 = 1½ teaspoons per gallon = (1/5 fl. oz.)

Garden Work for January

Gardeners may be relaxing now and enjoying the rewards of earlier work. However, there are tasks which must be attended to in January if the display is to continue. Except where mulches have been applied, the hoe or hand-fork should be kept busy among the plants helping to control annual weeds.

Use of Water

Where beds and lawns are suffering from a prolonged dry period full use should be made of sprinklers and hoses. Plants should not be allowed to become excessively dry before water is applied because the roots damaged by such a drought will never completely recover. Flower beds, shrubbery, and lawns should be given a thorough watering at least every 3 weeks. This will mean that except where restrictions are imposed some part of the garden can receive a good watering each evening in rotation. This is preferable to sprinkling the whole area each day. Young plants and shallow-rooted types should be watered individually as soon as they show signs of wilting, and plants such as the autumn-flowering chrysanthemums, which should now be making good growth, can also be given extra water.

Mixed Flower Border

The results achieved in the planned border should be noted as the season progresses and any desirable alterations recorded so that the display can be improved in future seasons. Such points should be written down so that they will not be forgotten during the annual overhaul. Where necessary extra support should be given to some of the larger plants such as dahlias, lilies, michaelmas daisies, and golden rod. Periods of gusty winds are often experienced in autumn and do severe damage where tying has not been adequate.

Chrysanthemums, dahlias, and other gross feeders will benefit from a further side-dressing of a general, balanced fertiliser. Delphiniums and michaelmas daisies should be checked for powdery mildew and sulphur sprays applied if necessary. Damage caused by thrips on gladiolus should be checked by spraying with DDT.

Virus Diseases

Dahlias, lilies, chrysanthemums, asters, and zinnias are a few of a wide range of plants which are susceptible to various virus diseases, especially spotted wilt virus. Virus diseases can be recognised only by the symptoms which they produce. These are many and varied, but the most usual ones are:—

1. Mottling or mosaic patterns on the leaves.

2. Stunting and sometimes death of growths and flowers.

3. Loss of colour along the veins of leaves.

4. Ring spots.

5. Distortion of the leaves.

6. Smaller flowers and breaking of their colours.

No sprays will kill viruses, but because many viruses are transferred from plant to plant by insects, plants should be sprayed regularly with lindane or malathion to reduce the insect population and the likelihood of their spreading these diseases. All diseased plants should be removed and burnt.

WORK IN FLOWER GARDEN

Applying a side-dressing of balanced fertiliser to a chrysanthemum plant.

Removal of Dead Flower Heads

Spent flowers should be removed as they appear, and with roses, they should be cut back to a good fat bud to induce further flowering. Most annuals respond well and can be kept flowering over a longer period if early treatment is given. However, any seed pods which may be required for winter use in floral arrangements should be judiciously guarded.

Potpourri

While there is an abundance of flowers in gardens it is a good time to use any leaves or petals which have a pleasing fragrance to make potpourri. Some of the best are roses, lavender, lemon-scented verbena, jasmine, calendula, stock, mignonette, heliotrope, geranium, rosemary, lemon balm, southernwood, santolina, or dianthus, but rose petals alone may be used. Pick the blooms when they are in full bud. Fully developed flowers are unsuitable, as much of the fragrance will have dispersed. Spread them carefully on sheets of paper or strips of cheese cloth in a dry, airy room away from the sun and turn them daily until they dry out completely. Half a teaspoon each of cloves, cinnamon, and mace may be added to a quart of dried material before storing in an airtight jar for future use in sachets and gift jars.

Preserving Plant Material

Throughout the season pickings of everlasting flowers should be made as each individual reaches suitable maturity. They make useful additions to the range of material available for winter floral arrangements. The daisy types such as helichrysum, rhodanthe, and acroclinium should be picked while the flowers are still in bud. If flowers are completely stripped of their leaves, tied in loose bundles by the ends of the stems, and hung upside down in a dry, airy place for about 3 weeks, they should be completely dried and stored until required for winter decorations. Blue butterfly delphinium, celosia, teasels, grassheads, and yellow yarrow (*Achillea filipendulina*) if picked before the flowers in the centre are quite out, will make useful additions to the range. The blooms of lavender should be picked as soon as they are fully opened. As the seed heads of rhododendrons, iris, lilies, and green ixia mature they should be stored carefully.

Now is an excellent time for preserving the leaves of the copper beech.

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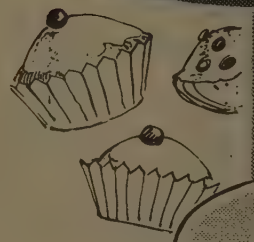

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M7.2

Pick the more mature pieces and arrange in a container filled with a mixture of half glycerine and half water. The leaves will soon absorb this liquid, taking on a glossy effect which they will retain indefinitely. Should the leaves tend to roll, flatten the whole piece by placing it under a carpet for several days.

Lawns

As the ground becomes more dry the lawn growth will be reduced and cutting need not be so frequent. The mower blade should be raised for a period, as very close cutting of a dry lawn will weaken the plants and the turf will deteriorate. The grass should not be allowed to grow more than 1½in. high; otherwise the finer grasses such as browntop may die out from excessive shading. A sharply defined lawn edge will give finish to the garden.

Preparations for Spring

Two plants which are often used for display in spring are forget-me-nots and wallflowers. Forget-me-not seed should be sown this month in a shaded, moist position so that the plants will be ready for planting out in autumn. Seed of very compact as well as the more open types is available. Wallflower plants should by now be ready for lining out in an inconspicuous area of the flower garden or in the vegetable area so that they will grow into big, bushy plants before being replanted into their flowering position in autumn. The plants should be set 9in. apart in rows 12in. apart. They will benefit from a light dressing of a general fertiliser when growth begins again. Young plants bought in autumn will give an inferior display to those which have been treated in this manner.

Rockery

Most seed heads should be removed from plants as the flowers fade, except those of alpine poppies and linaria, which can be left to reseed. Strong-growing plants should not be allowed to encroach on their weaker neighbours, which though slower growing, may be more valuable garden plants. If the large plants are clipped back now, suitable material will be available for replacing the old plant in early autumn. It is wise to remove immediately any weeds such as white clover, oxalis, or twitch before they become established.

It is sometimes thought that rock plants can tolerate very dry conditions. This is not so with most true rock plants, which in their native habitat are well supplied with the moisture from melting snow. If the plants show signs of wilting, let the hose lie on the rockery and trickle for several hours. If water is sprayed on to plants with a thick, hairy tomentum on their leaves, the water may lodge and cause the plant to rot.

Bulbs

Bulbs of belladonna lilies, nerines, and colchicums may now be planted. Colchicums should be planted with their long necks just below the soil surface; the others should be only partially buried with the necks, or half the bulb, above the ground. As the early lilies such as *L. candidum*, *L. regale*, and *L. testaceum* finish flowering they can safely be lifted to new positions. Before the bulbs are lifted the new site should be prepared by the incorporation into the soil of any available well-rotted organic matter; for example, leafmould, compost, or animal manure. The bulbs should be lifted carefully to avoid damage to the roots which are never completely dormant, and then replanted immediately so that the roots do not dry out.

Other bulbs can be lifted now and stored in an airy position until transplanted next month. Any new bulbs should be ordered. Gladiolus may be lifted and stored after a maturing period of 6 weeks has elapsed from flowering. If these bulbs are left longer, it is difficult to remove all the cormlets, which then become weeds.

General

Budding of roses and other ornamentals can be started this month as the wood matures. The wood is mature when a thorn pressed sideways will snap off cleanly. Details on budding were given in the December 1956 issue of "The Journal".

A gladiolus plant completely ruined by thrip damage because it was not sprayed with DDT emulsion.

New carnation plants may be obtained by taking cuttings or layering the long shoots. Only healthy plant material should be used for propagation. Any sickly plants should be examined and sprayed with lindane or malathion if insects are present. If there is a purple-black smutty appearance inside the base of the flower, this may be due to the fungous disease anther smut, which has recently been recognised in New Zealand. Should this be suspected, the nearest office of the Department of Agriculture should be notified so that the disease can be identified and the source of infection destroyed. No spray materials have proved effective and so destruction is necessary.

Partially matured cuttings of a wide range of material from geraniums to photinia or luculia may be taken now. The cuttings should be set in a well-drained rooting medium in a cool, shaded position and not allowed to dry out.

Most seed from shrubs, perennials, and biennials should have been sown by now, but it is not yet too late. The young seedlings are very susceptible to drought and should not be allowed to dry out.

Summer pruning of roses may be continued by the removal of all spent blooms. A definite cutting back to a good bud at this time, accompanied by an additional fertiliser application, will assure a good autumn display.

Window boxes should be watched closely and watered copiously if they are to continue their display. Where plants are past their usefulness they may be replaced by other pot-grown plants, provided they are well watered into position.

In the greenhouse the atmosphere may be kept cool and humid by generously watering the floors and benches each day. This will help to discourage red spider mites, but should their numbers build up, it may be necessary to fumigate the house. The smoke bombs which are generally available for this purpose are easy to operate and are very efficient. Pot plants should not be allowed to dry out nor should water be splashed on to the tender leaves. Ferns, begonias, and other flowering plants will respond well if given a liquid feed of animal manure or a soluble, balanced fertiliser. Such fertilisers, when applied to a dry pot, will often damage the young rootlets, so the soil should be well watered previously. Young tuberous begonias should be potted into larger pots as soon as the roots are visible when the plant is turned out of the pot. A potting compost, high in organic matter, will give good results.

Plants should be regularly examined for pests and diseases and suitable sprays applied.

EARLY MORNINGS CALL FOR...

MARATHON GUMBOOTS

For the man whose work demands that he be out and about all hours of the day or night . . . wet or fine, in mud, grass or scrub . . . there is no better Gumboot than MARATHON. Farmers, Sportsmen and all Outdoormen can rely on Marathon for comfort and protection, wherever they are, whatever the going.

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Men's Knee
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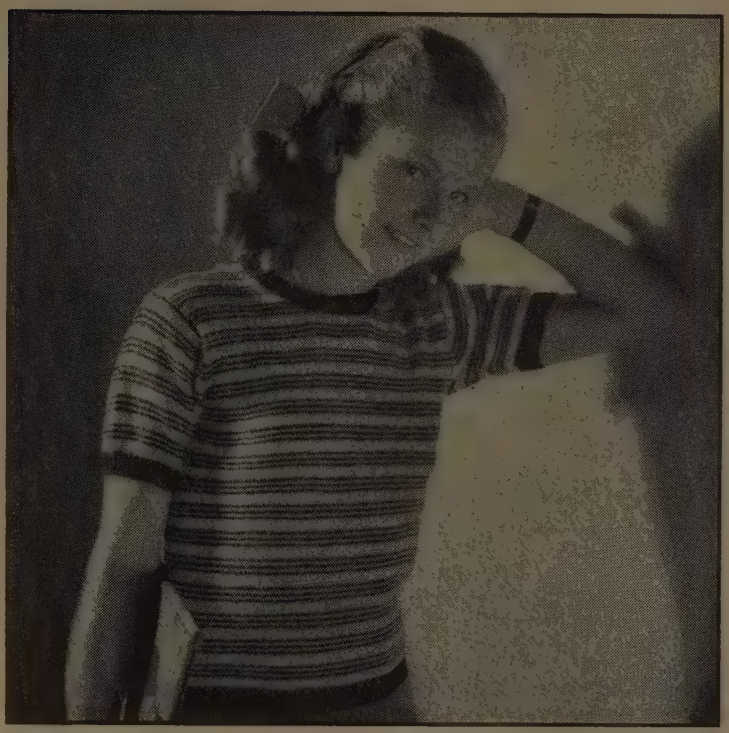
"Buller"
7½" Laced
Ankle Boot

"Perth" Knee
Gumboot

MARATHON GUMBOOTS *by Skellerup*

Young Girl's Beach Shirt

SUMMER picnics at the beach or in the country call for garments which are bright and attractive but which will stand up to hard wear. The beach shirt illustrated at right can be knitted in contrasting colours or in different shades of the same colour and would prove a popular and valuable addition to a young girl's wardrobe. The range of three sizes given should provide for most girls of primary school age.



ABBREVIATIONS: K., knit; p., purl; st., stitch(es); rep., repeat; beg., beginning; dec., decrease; inc., increase; tog., together; dk., dark; lt., light; cont., continue; st.st., stocking stitch (1 row k., 1 row p.).

Materials: 2oz. of 3-ply wool in dk. and 3oz. in lt. for sizes 1 or 2; 3oz. of 3-ply wool in dk. and 4oz. in lt. for size 3; 2 No. 9, 2 No. 11, and 2 No. 13 knitting needles pointed at both ends; 4 white buttons.

Measurements: Length 16in., chest 26in., and sleeve seam 3½in. for size 1; length 18in., chest 28in., and sleeve seam 4in. for size 2; length 20in., chest 30in., and sleeve seam 4½in. for size 3.

Tension: 7 st. to 1in.

When single row stripes are being worked it is advisable to slip st. back to other end of needle to avoid breaking off the wool and having a lot of ends.

For size 1 work as given; for size 2 work as given but substitute first number of st., rows, or in. in brackets for the original number; for size 3 work as given but substitute second number of st., rows, or in. in brackets for the original number.

The Front

With No. 11 needles and dk. wool cast on 92 (99, 106) st. loosely and work 1in. in k. 1, p. 1 rib. Change to No. 9 needles. Cont. in st.st. in the following order of stripes: 4 rows lt., 1 row dk., 1 row lt., 1 row dk., 1 row lt., 1 row dk. Cont. working in this way until work measures 10½in. (12in., 13½in.) approximately, ending with the 5 rows of single row stripes.

Shaping the Armholes

Cast off 3 (4, 5) st. beg. of next 2 rows, then dec. 1 st. both ends of every row until 78 (83, 86) st. remain. Cont. without shaping until work measures 14in. (15½in., 17½in.).

Shaping the Neck

Next row: Work across 33 (34, 35) st., leave next 12 (15, 16) st. on a spare needle, work to end. Cont. in striped pattern on last set of st., dec. 1 st. at neck edge on every row until 23 (24, 25) st. remain. Proceed without shaping until work measures 16in. (18in., 20in.), finishing at armhole edge.

Shaping the Shoulders

Cast off 8 st. on next 2 rows beg. armhole edge, then cast off remaining st. Rejoin wools to second set of st. at neck edge and work to match with first side.

Front Neck Band

With right side of work facing and using No. 13 needles and dk. wool k. up 62 (66, 72) st. evenly round neck edge. Work 8 (10, 12) rows in k. 1, p. 1 rib. Cast off loosely in rib.

The Back

Work as given for front to end of armhole shapings, then proceed without shaping until work measures 15¾in. (17¾in., 19¾in.). Next row: Work across 27 (28, 29) st., leave next 24 (27, 28) st. on a spare needle, work to end.

Shaping the Shoulders

Next row: Cast off 8 st. at armhole edge and dec. 1 st. at neck edge of row.

Next row: Dec. 1 st. at neck edge. Rep. last 2 rows once. Cast off remaining st. Rejoin wools to remaining st. and work 1 row to armhole edge. Now work as given for first shoulder.

Back Neck Band

With right side of work facing and using No. 13 needles and dk. wool k. up 36 (40, 44) st. evenly round neck edge.

Work 8 (10, 12) rows in k. 1, p. 1 rib. Cast off loosely in rib.

Sleeves

Using No. 11 needles and dk. wool cast on 70 (76, 80) st. Change to No. 13 needles and work 8 (10, 12) rows in k. 1, p. 1 rib. Change to No. 9 needles and cont. in the striped pattern, beg. with 4 rows lt., inc. 1 st. both ends of the 3rd row and of every following 4th row until there are 78 (84, 92) st. on needles. Proceed without shaping until work measures approximately 3½in. (4in., 4½in.) finishing with the 5 rows of stripes.

Shaping the Top

Cast off 4 st. at beg. of next 2 rows. Keeping continuity of the stripes dec. 1 st. both ends of every row until 38 (40, 40) st. remain. Cast off remaining st.

Making up

Press work lightly on wrong side, using a hot iron over a damp cloth. Join side and sleeve seams. Join shoulder seams for 1in. at armhole edges. Sew sleeves into armholes with narrow backstitch seams matching pattern stripes carefully. Press seams. Make 2 buttonloops on each front shoulder and sew on buttons to match.

NEW ZEALAND JOURNAL OF AGRICULTURE

Index to Volume 95, July-December 1957

July 1-104, August 105-216, September 217-320, October 321-424, November 425-528, December 529-632

A
Air Strips, Partitioned Bulk Store for, 120.
Air Transport of Bees, Container for, 36.
Allo, A. V.—
Mistakes in Silage Making, 35.
Ragwort Control, 347.
Andesite and Basalt Rock Soils of Auckland Province, Molybdenum on, 173.
Aphids in Brassica Crops, Control of, 463.
Aphids in Cruciferous Crops, Control of, 559.
Army Worm, Control of, 463, 559.
Ashburton County, Lamb Ill-thrift in, 449.
Auckland, North, Beekeeping in, Probable Effects of Manuka Blight on, 279.
Auckland Province, Basalt and Andesite Rock Soils of, Molybdenum on, 173.
Auckland Province, Molybdenum on Clay and Gumland Soils of, 56.
Ayson, E. C.—Blackberry Control on Hill Country, 463.

B
B.Agr. Degree, 566.
Baling, Hay, Low-density, 593.
Balloon to Trap Insects, 81.
Barrer, P. R.—
Crops for Summer Feeding of Sheep in South Island, 347.
Harvesting of Small Seeds, 559.
Nitrogen Topdressing for Grass Seed and Cereals, 131.
Pest Control in Crops, 463.
Spring Pasture Management in South Island, 131.
Topdressing and Oversowing of South Island Hill Country, 35.
Weed Control in Cereal Crops, 131.
Basalt and Andesite Rock Soils of Auckland Province, Molybdenum on, 173.
Basket, Waste, Folding, 317.
Bath-mat with Matching Scuffs, 90.
Beach Shirt, Young Girl's, 629.
Bedding Plants in Flower Garden, 96.
Bee Colonies, Domestic, Increase of, 225.
Bee Escapes for Removal of Honey, 561.
Beekeeping, Domestic, Notes, 225, 353, 457, 581.
Beekeeping in North Auckland, Probable Effects of Manuka Blight on, 279.
Bees, Chalk Brood Disease of, 562.
Bees, Container for Air Transport of, 36.
Bees, Package, 121.
Beet, Fodder, for Cattle and Sheep, Dangers of, 227.
Bennett, A. W.—Domestic Beekeeping Notes, 225, 353, 457, 581.
Biscuits Made without Eggs, 82.
Blackberry Control on Hill Country, 463.
Blick, C. M., Clarke, N. A., and Bull, H. McM.—Molybdenum on N.Z. Soils: Clay and Gumland Soils of Auckland Province, 56.
Boar, Care of the, 459.
Bobby, F. C., and Edmondson, J.—Effect of "Entramin A" on Sexual Maturity and Egg Production of Pullets, 439.
Bobby, F. C.—Free Range Management of Growing Poultry Stock, 349.
Book Review, 120.
Boxes and Tubs, Growing Plants in, 405.
Boyer, M. G.—Summer Crops, 247.
Brasell, J. M.—Hill Country Water Supplies, 131.
Brassicas, Field, and Onions, Weed Control in, 607.
Britain, Government Assistance to Farmers in, 147.
Britain-N.Z. Trade Talks, 157.
Britain, Pasture Research in, 133.
Browntop Seed Production of, 7.
Buddle, M. B.—Vaccine for Infertility in Rams, 117.
Building Construction, Farm, 65, 181.
Building, Farm, New Methods of, 251.
Buildings, Farm, Repairs of, 35.
Bulk Store, Partitioned, for Air Strips, 120.
Bull, H. McM., Clarke, N. A., and Blick, C. M.—Molybdenum on N.Z. Soils: Clay and Gumland Soils of Auckland Province, 56.
Bull, H. McM.—
Crops for Facial Eczema Control, 341.
Partitioned Bulk Store for Air Strips, 120.

C
Cages for Household Poultry, 231.
Cakes, Fruit, Rich, 301.
Cakes Made without Eggs, 82.
Calder, G. G.—Conservation Farming in Central Otago, 273.
Cameron, M. L.—Replacement of Winter Fodder Crops Susceptible to Cauliflower Mosaic, 535.
Campbell, D. A.—A Conservation Farming System for N.Z. Hill Country, 161.
Campbell, Eleanor S.—
Bath-mat with Matching Scuffs, 90.
Folding Waste Basket, 317.
Campion, Rosalie A., and Marcussen, K. H.—Flower Garden Notes, 96, 203, 307, 405.
Campion, Rosalie A., and Salinger, J. P.—Flower Garden Notes, 506, 621.
Canterbury, Trees Suitable for, 17.
Cardigan, Child's Seamless Classic, 319.
Carpets and other Floor Coverings, Choosing, 416.
Caterpillar Damage to Commercial Potato Crops, 603.
Cattle, Dangers of Fodder Beet for, 227.
Cattle on Pumice Land, Molybdenum Poisoning in, and Its Control by Injection of Copper, 218.
Cauliflower Mosaic, Replacement of Winter Fodder Crops Susceptible to, 535.
Central Otago, a Changing Grassland Scene, 238.
Central Otago, Conservation Farming in, 273.
Central Otago, Farming in Ida Valley in, 585.
Central Otago, Pasture Establishment in, 545.
Cereal Crops, Weed Control in, 131.
Cereals, Nitrogen Topdressing for, 131.
Cereals, Variety Trials with, 377.
Chainsaw, Cutting Silage with, 257.
Chalk Brood Disease of Bees, 562.
Chamberlain, H. de O.—Pest Control, 559.
Cheese, Cream, Ways of Serving, 620.
Chewings Fescue Seed Production, 293.
Child Drownings, Covers for Sheep Dips to Prevent, 235.
Children, Shoes for, 91.
Child's Seamless Classic Cardigan, 319.
Child's Sunfrock and Hat, 522.
Christmas Decorations, 514.
Christmas Tree, Grow Your Own, 179.
Christmas Trees, Cutting Growing Trees to make, Condemned, 464.
Citrus Fruit Production and Plantings, Trends in, 609.
Citrus Rootstocks and Varieties for N.Z., 393.
Clarke, N. A., and Halliwell, H. G. B.—Molybdenum on N.Z. Soils: Basalt and Andesite Rock Soils of Auckland Province, 173.
Clarke, N. A., Blick, C. M., and Bull, H. McM.—Molybdenum on N.Z. Soils: Clay and Gumland Soils of Auckland Province, 56.
Clay and Gumland Soils of Auckland Province, Molybdenum on, 56.
Clover, Red, Seed Production, 463.
Clover, White, at High Altitude, 445.
Congdon, N. B.—Automatic Spraying Equipment in Hawke's Bay Orchards, 26.
Conservation Farming in Central Otago, 273.
Conservation Farming System for N.Z. Hill Country, 161.
Conservation, Soil, on North Island Hill Country, 378.
Cooking without Eggs, 82.
Copper, Control of Molybdenum Poisoning in Cattle on Pumice Land by Injection of, 218.
Copper Methylarsenate and Finely Ground Phenothiazine, Effects of, on Worms in Sheep, 601.
Copper Methylarsenate, Toxicity of, to Sheep, 601.
Cosmetic Hold-all, 614.
Cottier, K.—Variety Trials with Cereals, 377.
Coup, M. R., and Williams, V. J.—Dangers of Fodder Beet for Cattle and Sheep, 227.
Couston, Eleanor, and Hunt, Mary—Christmas Decorations, 514.
Couston, Eleanor—
Cosmetic Hold-all, 614.
Household Uses for Silicones, 422.
Covers for Sheep Dips, 235.
Cows, Dairy, in Milk in N.Z., Distribution of, 360.
Cream and Milk, Cooling of, 574.
Cream and Milk, Feed Flavours in, 479.
Cream Cheese, Ways of Serving, 620.
Cream Flavour, Defects in, Caused by Addition of Water, 226.
Crested Dogstail Seed Production, 598.
Crop and Pasture Management, 247, 347.
Crops for Facial Eczema Control, 341.
Crops for Winter Feeding of Pigs, 259.
Crops, Winter Fodder, Susceptible to Cauliflower Mosaic, Replacement of, 535.
Crosbie, C. J.—Repair of Farm Buildings, 35.
Crossbred Wool at Shearing, Handling, 322.
Cross, M. W., and Robinson, G. S.—Overdrilling Pumice Pastures, 283.
Cunningham, I. J.—Molybdenum Poisoning in Cattle on Pumice Land and its Control by Injection of Copper, 218.
Cutting Silage with a Chainsaw, 257.

D
Dairies, Factory Supply, Classification of, 401.
Dairy Cows in Milk in N.Z., Distribution of, 360.
Dairy Farms, Summer Pasture Management on, 559.
Dairy Produce Graded for Export during April, 16; during May, 185; during June, 288; during July, 336; during August, 440; during September, 536.
Darts and Tucks, 213.
Decorations, Christmas, 514.
Decorative Plants in Home, 307.
Dip, Pot, a, 289.
Dips, Sheep, Covers for, to Prevent Child Drownings, 235.
Disease, Chalk Brood, of Bees, 562.
Disease in Domestic Bees and Brood, Prevention of, 353.
Dogstail, Crested, Seed Production, 598.
Domestic Beekeeping Notes, 225, 353, 457, 581.
Domestic Bees and Brood, Prevention of Disease in, 353.
Doutre, J. L.—Topdresser that Mixes as it Sows, 539.
Drainage by Pumping, 73.
Drainage, Farm, Laying out Tiles for, 392.
Drainage, Land, Sighting Level for, 503.
Drainage Water, Loss of Sulphur in, 16.
Drains, Mole, Joining, to Existing Tile Lines, 376.
Drinks for Summer, 523.
Duncan, A. A.—Joining Mole Drains to Existing Tile Lines, 376.
Duncan, J. E.—What Wool Buyers Take into Account, 426, 549.
Dusting Sheep, 323, 375.

E
Eczema, Facial, Control, Crops for, 341.
Eczema, Facial, Warnings, District Committees for, 563.
Edmondson, J., and Bobby, F. C.—Effect of "Entramin A" on Sexual Maturity and Egg Production of Pullets, 439.
Eggers, H. W. T.—Farm Building Construction, 65, 181, 251.
Eggless Cookery, 82.
Eggs, Natural Hatching of, 41.
Egmont County, Farm Improvement in, 482.
Electric Fence for Sheep, 580.
Elliott, D. C., Thomas, P. L., and O'Grady, B.—Effects of Copper Methylarsenate and Phenothiazine on Worms in Sheep, 601.
"Entramin A", Effect of, on Sexual Maturity and Egg Production of Pullets, 439.
Evans, H., Stuart, R. C., Tocker, H. H., and Stonyer, E.—Lamb Ill-thrift in Ashburton County, 449.
Extension Division, Senior Appointments in, 16.
Extracting Equipment, Domestic Apiary, Checking of, 457.

F
Facial Eczema Control, Crops for, 341.
Facial Eczema Warnings, District Committees for, 563.
Factory Supply Dairies, Classification of, 401.

Faithful, W.—Chewings Fescue Seed Production, 293.
Farm Building Construction:
Joinery and Internal Finishing Materials, 181.
New Methods of Building, 251.
Sheathing and Flooring, 65.
Farm Building, new Methods of, 251.
Farm Buildings, Repair of, 35.
Farm Drainage, Laying out Tiles for, 392.
Farmers' Conference Week at Ruakura, 107.
Farmers in the United Kingdom, Government Assistance to, 147.
Farm Gateways, Wood Shavings Prevent Cutting up in, 116.
Farm Improvement in Egmont County, 482.
Farming, Conservation, in Central Otago, 273.
Farming in Ida Valley, Central Otago, 585.
Farming in Karamea, 2.
Farming System, Conservation, for Hill Country, 161.
Farm Tree Nursery, 127.
Fawcett, E. J., Retirement of, 537.
Feed Flavours in Milk and Cream, 479.
Feeding of Pigs, Winter, Crops for, 259.
Fence, Electric, for Sheep, 580.
Fence Posts, Durable, for 4s. Each from Farm-grown Radiata, 481.
Fertilisers for Warepa Soils, 125.
Fertilisers, Phosphatic, in Pasture, No Benefit from Subsurface Placement of, 245.
Fertiliser Use in N.Z., Growth of, 186.
Fescue, Chewings, Seed Production, 293.
Fletcher, W. A.—
Citrus Varieties and Rootstocks for N.Z., 393.
Sub-tropical Fruit Production, 584.
Trends in Citrus Fruit Production and Plantings, 609.
Floor Coverings, Choosing, 416.
Floors, Farm Building, 71.
Flower Garden Notes, 96, 203, 307, 405, 506, 621.
Fly Control, Insecticides for, 110.
Foam Rubber in the Home, 615.
Fodder Beet for Cattle and Sheep, Dangers of, 227.
Fodder Crops, Winter, Susceptible to Cauliflower Mosaic, Replacement of, 535.
Folding Waste Basket, 317.
Free Range Management of Growing Poultry Stock, 349.
Fruit Cakes, Rich, 301.
Fruit, Choosing, for Shows, 501.
Fruit Production, Citrus, and Plantings, 609.
Fruit Production, Sub-tropical, 584.

G Garden, Flower, Notes, 96, 203, 307, 405, 506, 621.
Garden, Flower, Weights and Measures in, 621.
Garden, Vegetable, Notes, 45, 139, 264, 363, 465, 567.
Gateways, Farm, Wood Shavings Prevent Cutting up in, 116.
Girl's, Young, Beach Shirt, 629.
Glass, A. N.—Soil Conservation on North Island Hill Country, 378.
Glasshouse Production, Commercial, 356.
Glue, D. I., and Matthews, L. J.—
Identification and Control of Rushes, 20.
Weed Identification: Variegated Thistle, 547.
Government Approved Turnip and Swede Seed, 356.
Government Assistance to Farmers in United Kingdom, 147.
Graham, J. A.—North Island Surface-sown Pastures, 35.
Grass-grub, Control of, 559.
Grassland Association Conference, N.Z., 222, 530.
Grassland Scene, Changing, Central Otago is a, 238.
Grassland, Tussock, 19.
Grass Seed, Nitrogen Topdressing for, 131.
Greig, A. M. W.—Don't Cut Growing Trees to Make Christmas Trees, 464.
Grindell, B. L.—Wood Shavings Prevent Cutting up in Farm Gateways, 116.
Ground, Swampy, Tractor Wheel Equipment for, 72.
Gumland and Clay Soils of Auckland Province, Molybdenum on, 56.

H Hadfield, W. V.—Harvesting Short-rotation Ryegrass Seed, 538.
Hall, A. D.—Early Irrigation, 247.
Halliwell, H. G. B., and Clarke, N. A.—Molybdenum on N.Z. Soils: Basalt and Andesite Rock Soils of Auckland Province, 173.
Hamblyn, C. J.—
Caterpillar Damage to Commercial Potato Crops, 603.
Haymaking, 463.
Increasing Clover on Hill Country, 347.
Sheep Farm Pasture Management, 247.
Summer Pasture Management on Dairy Farms, 559.
Harvesting, Water, 223.
Hatching of Eggs, Natural, 41.
Hat, Sun, for Child, 522.
Hawke's Bay Orchards, Automatic Spraying Equipment in, 26.
Hay Baling, Low-density, 593.
Haymaking, 463.
Hill Country, a Conservation Farming System for, 161.
Hill Country, Blackberry Control on, 463.
Hill Country, North Island, Soil Conservation on, 378.
Hill Country, Oversowing and Topdressing, 35.
Hill Country Water Supplies, 131.
Hive Lid Fastener, 55.
Hold-all, Cosmetic, 614.
Holder, Stocking, 320.
Home Garden Notes, 45, 139, 264, 363, 465, 567.
Home Orchard in Spring, 111.
Home Orchard in Summer, 497.
Honey, Bee Escapes for Removal of, 561.
Honey, Harvesting, in Domestic Apiary, 581.
Honey, Processing, 491.
Honey, Production of, from Domestic Apiaries, 225.
Honey Tank, Tilting Stand for, 403.
Household Poultry, Cages for, 231.
Household Poultry, Management of, in Cages, 335.
Household Poultry Notes, 41, 335, 543.
Household Uses for Silicones, 422.
Housing for Household Laying Pullets, 543.
Hunt, Mary, and Couston, Eleanor—Christmas Decorations, 514.
Hunt, Mary—
Cream Cheese, 620.
Darts and Tucks, 213.

I Ida Valley, Central Otago, Farming in, 585.
Infectious Laryngotracheitis of Poultry, 249.
Infertility in Rams, Vaccine for, 117.
Insecticides for Lice Control, 110.
Insects, Balloon to Trap, 81.
Internal Finishing Materials for Farm Buildings, 181.
Invermay, Phosphate Trials at, 263.
Irrigation Races, Cleaning, 505.

J Johnson, L. H.—Processing Honey, 491.
Joinery for Farm Buildings, 181.
Joining a Skein of Wool, 318.
Jolliffe, W. H.—Trees on the Farm, 17, 127.
Jordan, B. T.—Developments in Silage Making, 475.
Josland, P.—Household Poultry Notes, 231, 335.

K Karamea, Farming in, 2.
Karlovsky, J.—No Benefit from Subsurface Placement of Phosphatic Fertilisers in Pasture, 245.
Ked Control, Insecticides for, 110.
Kennelly, A. G.—Home Garden Notes, 45, 139, 264, 363, 465, 567.

L Lace Stole for Evening Wear, 424.
Lamb Ill-thrift in Ashburton County, 449.
Land Development on a Northland Problem Soil, 233.
Land Drainage, Sighting Level for, 503.
Laryngotracheitis, Infectious, of Poultry, 249.
Lawns, Deteriorated, Renovation of, 300.
Lawns, Lighter Rates of Seeding for, 185.
Laying out Tiles for Farm Drainage, 392.
Level, Sighting, for Land Drainage, 503.
Lice Control, Insecticides for, 110.
Lid Fastener, Hive, 55.
Livestock, Care of, during August, 34; during September, 130; during October, 246; during November, 346; during December, 462; during January, 558.
Longwill, A.—
1957 Pig Carcass Competitions, 575.
"Weaner Coop" Keeps Young Pigs Warm, 43.
Low-density Hay Baling, 593.
Lynch, P. B.—
Pasture Research in Britain, 133.
Water Harvesting, 223.
Lyons, Christine—
Biscuits, Cakes, and Puddings without Eggs, 82.
Choosing Carpets and other Floor Coverings, 416.
Summer Drinks, 523.
Sunfrock and Hat for Child, 522.

M McFetridge, M. J.—
Cooling of Milk and Cream and Chilling of Town Milk, 574.
Defects in Cream Flavour Caused by Addition of Water, 226.
Maclean, Shona M.—Tussock Grassland, 19.
McPherson, G. K.—Sheep-carrying Capacity Trial at Winchmore Irrigation Research Station, 357.
MacPherson, Molly—Stocking Holder, 320.
Manuka Blight, Probable Effects of, on Beekeeping in North Auckland, 279.
Manuring in Home Orchards, 115.
Marcussen, K. H., and Campion, Rosalie, A.—Flower Garden Notes, 96, 203, 307, 405.
Marcussen, K. H.—Grow Your Own Christmas Tree, 179.
Mason, G., Mouat, A. H., and Stuart, R. C.—Farming in Ida Valley, 585.
Matthews, L. J., and Glue, D. I.—
Identification and Control of Rushes, 20.
Weed Identification: Variegated Thistle, 547.
Matthews, L. J.—Control of Nassella Tussock, 441.
Mattresses, 198.
Meteorological Records for May, 43; for June, 160; for July 272; for August, 356; for September, 458; for October, 544.
Milk and Cream, Cooling of, 574.
Milk and Cream, Feed Flavours in, 479.
Milk, Town, Chilling of, 574.
Mole Drains, Joining, to Existing Tile Lines, 376.
Molybdenum on N.Z. Soils:
Basalt and Andesite Rock Soils of Auckland Province, 173.
Clay and Gumland Soils of Auckland Province, 56.
Molybdenum Poisoning in Cattle on Pumice Land and its Control by Injection of Copper, 218.
Money, S. P.—
Home Orchard in Spring, 111.
Home Orchard in Summer, 497.
Montgomery, R. G.—
Handling Crossbred Wool at Shearing, 322.
Work in Woolshed Responsibility of Sheep Owner, 464.
Mosaic, Cauliflower, Replacement of Winter Fodder Crops Susceptible to, 535.
Mouat, A. H., Stuart, R. C., and Mason, G.—Farming in Ida Valley, 585.
Mullins, H. K.—Practical Equipment for Poultry Keepers, 5.

N Nairn, R. G.—Hive Lid Fastener, 55.
Nassella Tussock, Control of, 441.
Neale, G. J.—
Farmers' Conference Week at Ruakura, 107.
Farm Improvement in Egmont County, 482.
Grassland Association Conference at Ruakura, 530.
N.Z.-U.K. Trade Talks, 157.
Nitrogen Topdressing for Grass Seed and Cereals, 131.
North Auckland, Beekeeping in, Probable Effects of Manuka Blight on, 279.
North Island Hill Country, Soil Conservation on, 378.
North Island Surface-sown Pastures, 35.
Northland Problem Soil, Land Development on, 233.

O Oaonui-Rahotu Farm Improvement Group, Field Day of, 482.
O'Grady, B., Elliott, D. C., and Thomas, P. L.—Effects of Copper Methylarsenate and Phenothiazine on Worms in Sheep, 601.
Onions and Field Brassicas, Weed Control in, 607.
Orchard, Home, in Spring, 111.
Orchard, Home, in Summer, 497.
Orchards, Hawke's Bay, Automatic Spraying Equipment in, 26.
Otago, Central, a Changing Grassland Scene, 238.
Otago, Central, Conservation Farming in, 273.
Otago, Central, Farming in Ida Valley in, 585.
Otago, Central, Pasture Establishment in, 545.
Overdrilling Pumice Pastures, 283.
Oversowing and Topdressing Hill Country, 35.
Owtram, I. H.—
Care of the Boar, 459.
Crops for Winter Feeding of Pigs, 259.

P Package Bees, 36, 121.
Pasture and Crop Management, 247, 347.
Pasture Establishment in Central Otago, 545.
Pasture Management, 463, 559.

Pasture, No Benefit from Subsurface Placement of Phosphatic Fertilisers in, 245.
Pasture Research in Great Britain, 133.
Pastures, Pumice, Overdrilling, 283.
Pastures, Surface-sown, North Island, 35.
Phenothiazine, Finely Ground, and Copper Methylarsenate, Effects of, on Worms in Sheep, 601.
Phosphate Trials at Invermay, 263.
Phosphatic Fertilisers in Pasture, Subsurface Placement of, No Benefit from, 245.
Pig Carcass Competitions, 1957, 575.
Pigs, Crops for Winter Feeding of, 259.
Pigs, Young, "Weaner Coop" for, 43.
Plants, Bedding, in Flower Garden, 96.
Plants, Decorative, in Home, 307.
Plants in Boxes and Tubs, Growing, 405.
Plastic Film, Use of, in the Garden, 140.
Playing Areas, Lighter Rates of Seeding for, 185.
Porina, Control of, 559.
Pot Dip, a, 289.
Potato Tuber Moth Damage to Commercial Potato Crops, 603.
Poultry Equipment, 5.
Poultry, Household, Cages for, 231.
Poultry, Household, Management of, in Cages, 335.
Poultry, Household, Notes, 41, 231, 335, 543.
Poultry, Infectious Laryngotracheitis of, 249.
Poultry Keepers, Equipment for, 5.
Poultry Stock, Growing, Free Range Management of, 349.
Processing Honey, 491.
Puddings Made without Eggs, 82.
Pullets, Effect of "Entramin A" on Sexual Maturity and Egg Production of, 439.
Pumice Land, Molybdenum Poisoning in Cattle on, and Its Control by Injection of Copper, 218.
Pumice Pastures, Overdrilling, 283.
Pumping, Drainage by, 73.
Pullets, Household Laying, Housing for, 543.
Purvis, G.—Feed Flavours in Milk and Cream, 479.

Q
Quigg, J. B.—Government Assistance to Farmers in United Kingdom, 147.

R
Radiata, Farm-grown, Provides Durable Fence Posts for 4s. Each, 481.
Ragwort, Control of, 347.
Rahotu-Oaonui Farm Improvement Group, Field Day of, 482.
Rams, Infertility in, Vaccine for, 117.
Red Clover Seed Production, 463.
Renovation of Deteriorated Lawns, 300.
Research Work by Extension Division:
Cleaning Irrigation Races, 505.
Fertilisers for Warepa Soils, 125.
Phosphate Trials at Invermay, 263.
Tussock Grassland, 19.
Variety Trials with Cereals, 377.
Weed Control in Field Brassicas and Onions, 607.
Richards, J. G.—Browntop Seed Production, 7.
Roberts, D.—
Container for Air Transport of Bees, 36.
Probable Effects of Manuka Blight on Beekeeping in North Auckland, 279.
Tilting Stand for Honey Tank, 403.
Robinson, G. S., and Cross, M. W.—Overdrilling Pumice Pastures, 283.
Rodle, J. E.—Bee Escapes for Removal of Honey, 561.
Ruakura Farmers' Conference Week, 107.
Rubber, Foam, in the Home, 615.
Rukuhia, New Laboratory Block for, 438.
Rushes, Identification and Control of, 20.
Russell, B. J.—Household Poultry Notes, 41.
Ryegrass Seed, Short-rotation, Harvesting, 538.

S
Salinger, J. P., and Campion, Rosalie A.—Flower Garden Notes, 506, 621.
Salisbury, R. M., and Staples, E. L. J.—Toxicity of Copper Methylarsenate to Sheep, 601.
Salisbury, R. M.—Infectious Laryngotracheitis of Poultry, 249.
Saxby, S. H., Appointed Assistant Director of Extension Division, 16.
Saxby, S. H.—Central Otago—a Changing Grassland Scene, 238.
Saxby, S. H., Receives Grassland Association Award, 531.
Schofield, R. C.—
Cleaning Irrigation Races, 505.
Pasture Establishment in Central Otago, 545.
Scott, D. F.—
Cutting Silage with a Chainsaw, 257.
Drainage by Pumping, 73.
Scott, R. S.—Phosphate Trials at Invermay, 263.
Scuffs and Bath-mat, 90.
Seal, D. W. A.—
Chalk Brood Disease of Bees, 562.
Package Bees, 121.
Seamless Classic Cardigan, Child's, 319.
Seasonal Notes by Extension Division, 35, 131, 247, 347, 463, 559.
Seeding Rates, Lighter, for Playing areas and Lawns, 185.
Seed Production in New Zealand:
Browntop, 7.
Chewings Fescue, 293.
Crested Dogstail, 598.
Seed, Short-rotation Ryegrass, Harvesting, 538.
Seeds, Small, Harvesting of, 559.
Shearing, Handling Crossbred Wool at, 322.
Sheathing Materials for Building, 65.
Sheep-carrying Capacity Trial at Winchmore, 357.
Sheep, Dangers of Fodder Beet for, 227.
Sheep Dips, Covers for, to Prevent Child Drownings, 235.
Sheep Dusting, 323, 375.
Sheep, Effects of Copper Methylarsenate and Finely Ground Phenothiazine on Worms in, 601.
Sheep, Electric Fence for, 580.
Sheep Owner, Work in Woolshed Responsibility of, 464.
Sheep, Toxicity of Copper Methylarsenate to, 601.
Shirt, Beach, Young Girl's, 629.
Shoes for Children, 91.
Short-rotation Ryegrass Seed, Harvesting, 538.
Shows, Choosing Fruit for, 501.
Sievwright, H. M.—White Clover at High Altitude, 445.
Sighting Level for Land Drainage, 503.
Silage, Cutting, with a Chainsaw, 257.
Silage Making, Developments in, 475.
Silage Making, Mistakes in, 35.
Silicones, Household Uses for, 422.
Skein of Wool, Joining, 318.
Smith, B. A. J.—Weed Control in Field Brassicas and Onions, 607.
Soil, a Northland Problem, Land Development on, 233.
Soil Conservation on North Island Hill Country, 378.
Soils of Auckland Province, Clay and Gumland, Molybdenum on, 56.
Soils, Warepa, Fertilisers for, 125.
South Island Hill Country, Topdressing and Oversowing, 35.
Spraying Equipment, Automatic, in Hawke's Bay Orchards, 26.
Spraying Work in Home Orchard in Spring, 111.
Spring Home Orchard Work, 111.
Spring Pasture Management and Topdressing, 131.
Stand, Tilting, for Honey Tank, 403.
Staples, E. L. J., and Salisbury, R. M.—Toxicity of Copper Methylarsenate to Sheep, 601.
Steer, W. T.—Electric Fence for Sheep, 580.
Stockdill, S. M. J.—
Fertilisers for Warepa Soils, 125.
Red Clover Seed Production, 463.
Spring Sowing of Pastures, 247.
Stocking Holder, 320.
Stole, Lace, for Evening Wear, 424.
Stonyer, E., Stuart, R. C., Tocker, H. H., and Evans, H.—Lamb Ill-thrift in Ashburton County, 449.
Strain, Maud B.—
Foam Rubber in Home, 615.
Joining a Skein of Wool, 318.
Mattresses, 198.
Rich Fruit Cakes, 301.
Shoes for Children, 91.
Stuart, A.—Crested Dogstail Seed Production, 598.
Stuart, R. C., Mason, G., and Mouat, A. H.—Farming in Ida Valley, 585.
Stuart, R. C., Tocker, H. H., Stonyer, E., and Evans, H.—Lamb Ill-thrift in Ashburton County, 449.
Subsurface Placement of Phosphatic Fertilisers in Pasture, No Benefit from, 245.
Sub-tropical Fruit Production, 584.
Sulphur, Loss of, in Drainage Water, 16.
Summer Drinks, 523.
Summer Work in Home Orchard, 497.
Sunfrock for Child, 522.
Supers, Placing of, in Domestic Apiary, 581.
Swampy Ground, Tractor Wheel Equipment for, 72.
Swarming in Domestic Bees, Prevention of, 457.
Swede and Turnip Seed, Government Approved, 356.

T
Tables of Weights and Measures in Flower Garden, 621.
Talt, A. N.—Growth of Fertiliser Use in N.Z., 186.
Thistle, Variegated, 547.
Thomas, P. L., Elliott, D. C., and O'Grady, B.—Effects of Copper Methylarsenate and Phenothiazine on Worms in Sheep, 601.
Thomas, P. L.—
Insecticides to Control Lice, Keds, and Flies, 110.
Safety Precautions in Sheep Dusting, 375.
Tile Junction, New Type of, 278.
Tile Lines, Existing, Joining Mole Drains to, 376.
Tiles for Farm Drainage, Laying out, 392.
Till, J. F.—Spring Pasture Management on Dairy Farms, 131.
Tilting Stand for Honey Tank, 403.
Tocker, H. H.—Farming in Karamea, 2.
Tocker, H. H., Stuart, R. C., Stonyer, E., and Evans, H.—Lamb Ill-thrift in Ashburton County, 449.
Tools and Equipment for Flower Garden, 203.
Topdresser that Mixes as it Sows, 539.
Topdressing and Oversowing Hill Country, 35.
Topdressing, Nitrogen, for Grass Seed and Cereals, 131.
Town Milk, Chilling of, 574.
Toxicity of Copper Methylarsenate to Sheep, 601.
Tractor Wheel Equipment for Swampy Ground, 72.
Trade Agreement with Britain, Signing of, 157.
Tree, Christmas, Grow Your Own, 179.
Trees, Christmas, Cutting Growing Trees to Make, Condemned, 464.
Trees on the Farm:
The Farm Nursery, 127.
Trees Suitable for Canterbury, 17.
Trees Suitable for Canterbury, 17.
Tubs and Boxes, Growing Plants in, 405.
Tucks and Darts, 213.
Turnip and Swede Seed, Government Approved, 356.
Tussock Grassland, 19.
Tussock, Nassella, Control of, 441.

V
Variegated Thistle, 547.
Vegetable Garden Notes, 45, 139, 264, 363, 465, 567.

W
Walker, C.—
Lighter Rates of Seeding for Playing Areas and Lawns, 185.
Renovation of Deteriorated Lawns, 300.
Wallace, J. O.—Disease Resistance of Turnip and Swede Varieties, 347.
Wallace, M. H.—Classification of Factory Supply Dairies, 401.
Warepa Soils, Fertilisers for, 125.
Warren, R. G.—Land Development on a Northland Problem Soil, 233.
Waste Basket, Folding, 317.
Water Harvesting, 223.
Waters, D. F.—Loss of Sulphur in Drainage Water, 16.
Water Supplies, Hill Country, 131.
Weed Control in Cereal Crops, 131.
Weed Control in Field Brassicas and Onions, 607.
Weed Control in Flower Garden, 506.
Weed Identification: Variegated Thistle, 547.
Weights and Measures in Flower Garden, 621.
Weston, L. H.—
Low-density Hay Baling, 593.
Tractor Wheel Equipment for Swampy Ground, 72.
Wheel Equipment, Tractor, for Swampy Ground, 72.
White Butterfly, Control of, 559.
White Clover at High Altitude, 445.
Wickenden, G. L.—Convenient Type of Pot Dip, 289.
Williams, V. J., and Coup, M. R.—Dangers of Fodder Beet for Cattle and Sheep, 227.
Winchmore Irrigation Research Station, Sheep-carrying Capacity Trial at, 357.
Winter Feeding of Pigs, Crops for, 259.
Winter Fodder Crops Susceptible to Cauliflower Mosaic, Replacement of, 535.
Woodcock, J. W., Appointed Director of Extension Division, 16.
Wood Shavings Prevent Cutting up in Farm Gateways, 116.
Wool Buyers' Point of View on Wool, 426, 549.
Wool, Crossbred, at Shearing, Handling, 322.
Wool, Joining Skein of, 318.
Woolshed, Work in, Responsibility of Sheep Owner, 464.
Wool, What Buyers Want in, 426, 549.
Worms in Sheep, Effects of Copper Methylarsenate and Finely Ground Phenothiazine on, 601.

Y
Y.F.C. Farm Safety Officers' Activities, 180.

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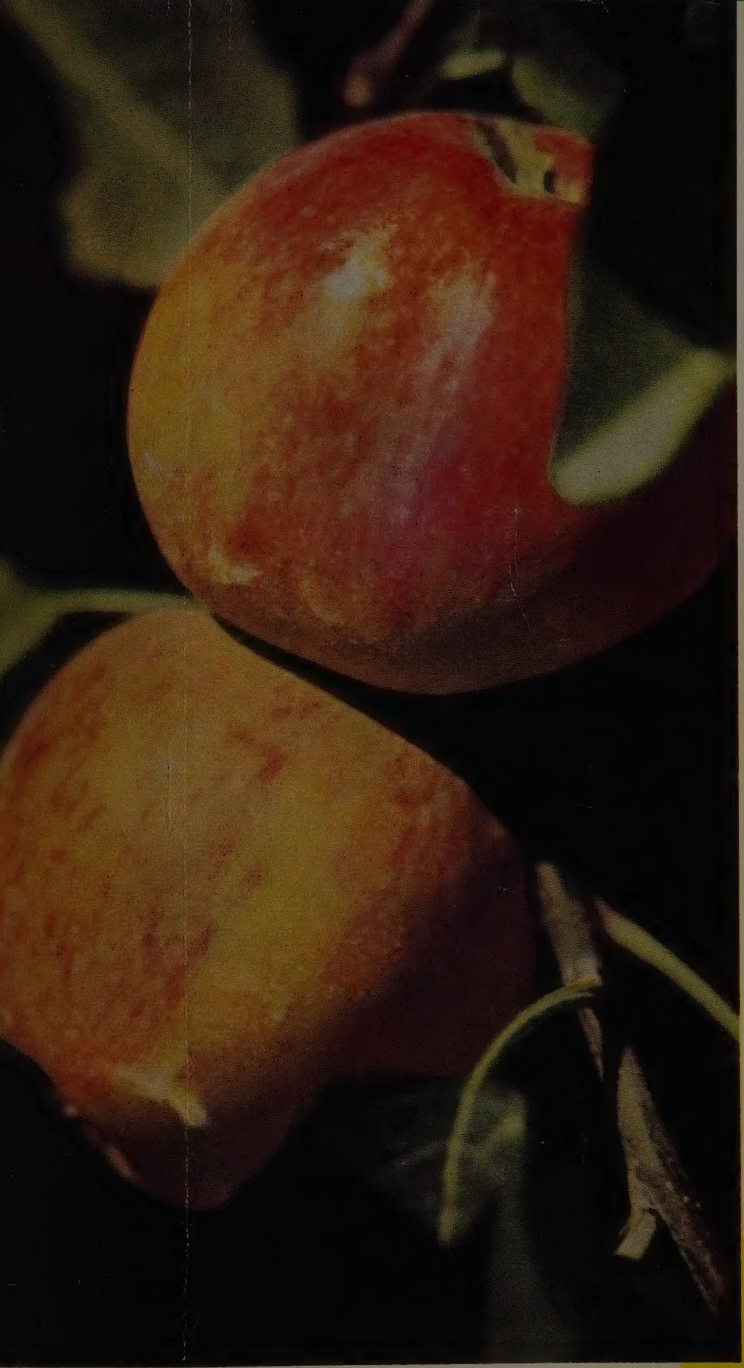

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This can be truly said to be the "Golden Era of Agriculture"—farmer and towns-folk alike share its prodigious gifts.

To all "Journal of Agriculture" readers, International Harvester extend Season's Greetings.

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